Heating and Ventilating

For Engineers and Contractors Controlling the Design, Specification, Installation and Maintenance of Heating, Ventilating and Air Conditioning

Volume 31 | DECEMBER, 1934 | Number 12

CONTENTS

Automatic Valves with Zone Control Systems ... *L. C. Plaehn* 17
Copper Pipe Used for Soil Heating ... 19
Air Conditioned Shops to Speed Construction of Huge Telescope ... 20
Standard Oil Stands Pat ... 22
Application of Coal Stokers to Bakers' Ovens ... *David Landau* 23
The Incinerator Nuisance ... 26
Modernizing Section ... 27-36
Manufacturers Protest Heating Contractors Code ... 37
Numerous Courses Offer Instruction in Heating and Air Conditioning ... 39
Air Conditioners Require Winter Care ... 40
Subsistence Homesteads: A Government Building Activity ... 41

DEPARTMENTS

Reference Data, 43 and 44, Hot Water Supply Data—2 ... Opposite 26
Editorials ... 45
Abstracts ... 46
News of the Month ... 48
Picture Paragraphs ... 52
New Equipment ... 60
Degree-Days for October, 1934 ... 64
The Weather for October, 1934 ... 66
New Catalogs ... 70

Published Monthly by

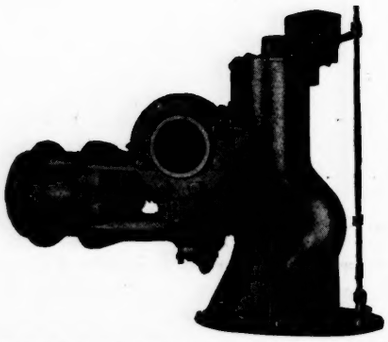
THE INDUSTRIAL PRESS, 148 LAFAYETTE STREET, NEW YORK

ROBERT B. LUCHARS, President
EDGAR A. BECKER, Vice-Pres. and Treasurer
ERIK OBERG, Secretary

C. H. B. HOTCHKISS, Editor
CLIFFORD STROCK, Associate Editor
JOSEPH F. KERN, Assistant Editor

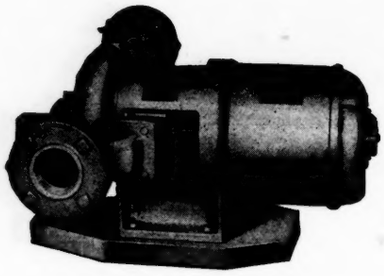
CLIFF W. PRESDEE, Advertising Manager
GEORGE G. TURNER, Western Representative
JOHN F. HYDE, Eastern Representative

Subscription, $2 per year in United States and Mexico. $2.50 in Canada. $3 all other countries. Single copies regular issue, 30 cents; special issues, $1.



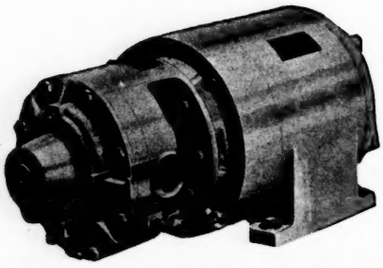
JENNINGS SUMP & SEWAGE PUMPS
PEDESTAL TYPE

Mounted entirely above the pit cover. Entirely self-priming. All working parts high and dry Only suction pipe submerged. Economical.



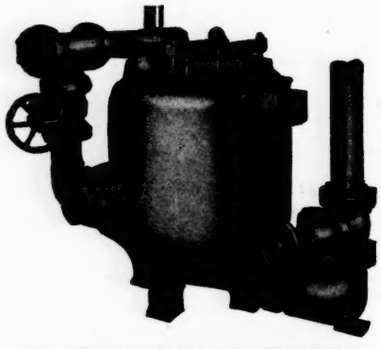
CENTRIFUGAL PUMPS
STANDARD AND SELF-PRIMING

Motor armature and pump impeller mounted on same shaft. No bearings in pump casing. One stuffing box. Simple, compact, reliable.



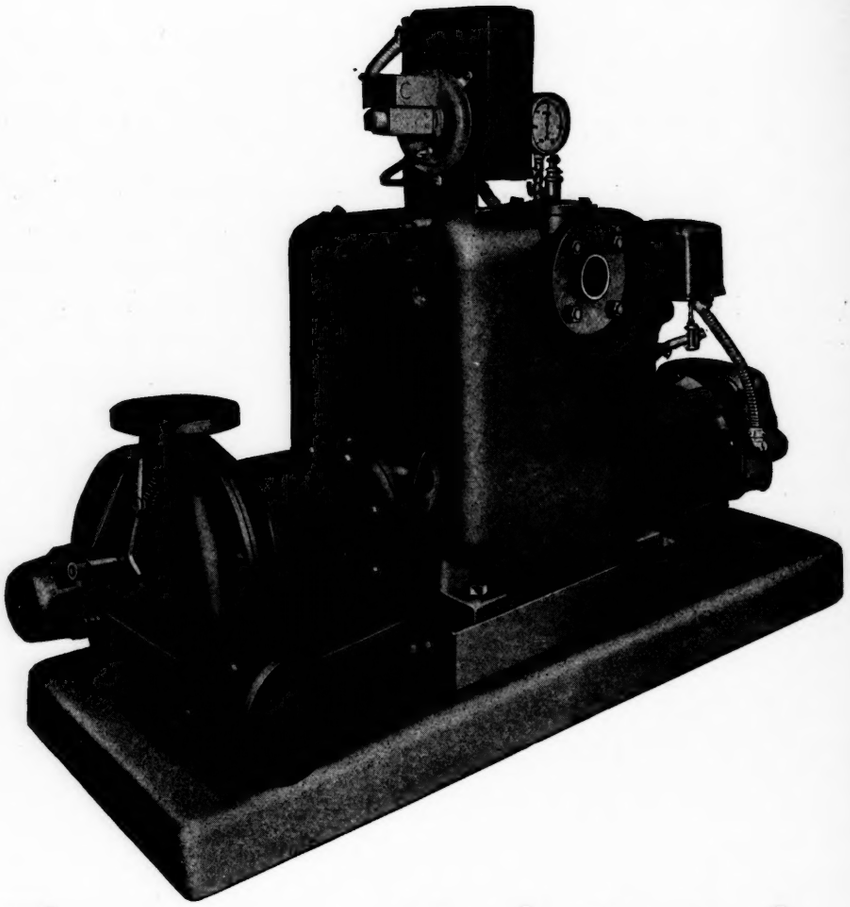
NASH HYTOR AIR COMPRESSORS

No sliding vanes, pistons nor parts in metallic contact. No internal lubrication. Non-pulsating. Clean air. Efficient and reliable.



JENNINGS SEWAGE EJECTOR

Most efficient device for pumping unscreened sewage from low levels, or pumping any heavy liquid with large proportions of solids.



There Is a Nash Unit for Every Pumping Service

There is a reason for the many thousands of installations of Nash Pumps. For over twenty years the name Nash has stood for reliability in pumping equipment. From the complete Nash line it is possible to select a superior pump for practically any service.

One of the newer members of the Nash Pump family is the Vapor Turbine Return Line Heating Pump above. Here is a pump that not only eliminates the cost of electric current, but promotes greater efficiency in your heating system than any other type of Heating Pump.

It can do this because it functions on a new system of controlled continuous operation, and is the only heating pump that can operate continuously with economy. Any Engineer knows that continuous removal of air and condensate means efficiency in a heating system.

Why not write us today for Bulletin 203 which gives all of the interesting details?

NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

Automatic Valves with Zone Control Systems

make it necessary to consider the possible effects of faulty piping and excessive boiler pressure. Adjustable time-operating period for automatic valves as a means of correcting difficulties.

By LOUIS C. PLAEHN†

In the past few years of decreased building activity considerable attention has been given to improvements that are possible on existing heating systems, and primarily those improvements which are self-liquidating. Naturally enough, the installation of zone control systems in existing buildings has become, and will continue to become, more common than ever because an investment in a good zone control usually pays the building management a very high rate of return on the investment, as well as maintaining more comfortable room temperatures for the building occupants.

Recent years have seen rapid development in the perfection of temperature control devices for regulating automatic zone valves including the use of conventional room thermostats together with more elaborate control devices in order to secure more accurate temperature regulation, and hence greater operating economies. These developments have brought forth temperature control mechanisms which control by a combination of radiator and room temperature; outdoor and room temperatures; outdoor, radiator, and room temperatures; infiltration losses and room temperature, and purely intermitting devices manually controlled by switches.

Improvements have also been made in the valve operators themselves, such as sealing motors and gear trains in oil to secure longer life, as well as securing more efficient and more powerful operating units. Motor valves have been spring-loaded so that positive shut off is secured when the valve is closed. Gears and cams have been heat-treated in order to add to their life, and in some cases some of the more recent designs of motor-operated valves even include the liberal use of roller bearings on cam assemblies. Many operating units that are used today on automatic valves are excellent pieces of equipment, well designed, and built in such a manner that they are durable, have sufficient power and, in general, may be classified as being foolproof and with practically no possibilities of operating failures.

While many things have been taken into consideration very little attention has been given to the time operating period of automatic valves or to the resultant effect on the installation. In some instances failure to consider the operating period of these valves has caused operating difficulties, and in isolated cases has actually caused damage to boilers and piping.

Control of boiler pressure in the case of boiler installations has not always been given sufficient thought by heating contractors and engineers responsible for the sale and installation of automatic valves for zone control purposes.

It is felt that a full discussion of these points will help heating contractors, engineers, and even building owners to prevent a repetition of these operating troubles.

Piping is Important

In the first place, even in new installations, and particularly in old installations, there is no assurance that the piping system throughout the building is properly graded, insuring rapid and complete drainage of the condensate. Consequently, an automatic valve that opens rapidly admits steam at such a rapid rate that live steam comes in direct contact with low temperature condensate, which cannot drain away quickly enough, resulting in water hammer which is not only objectionable, due to accompanying noise, but which in some cases may become violent enough to cause failure of the pipe fittings themselves.

The first and obvious remedy is to secure proper grading, dripping, or any other piping change which would result in the condensate being rapidly and completely drained. On new construction this should be entirely a matter of careful installation and good superintendence. On existing installations, places where piping is not graded properly are not always easy to find and sometimes locating them is practically impossible. In such cases evidently little or nothing can be done about making the necessary changes in the piping. Moreover, making pipe changes in an existing installation is very often slow, expensive work. Correction of improper piping is, however, so obviously a solution of noise difficulties that it should be carefully looked into, located if possible, and corrected, if corrections can be made at reasonable cost.

Slow-Opening Automatic Valves

Where such difficulty cannot be remedied by piping changes it is possible to correct it by the use of auto-

†Barber-Colman Company of Wisconsin, Inc.

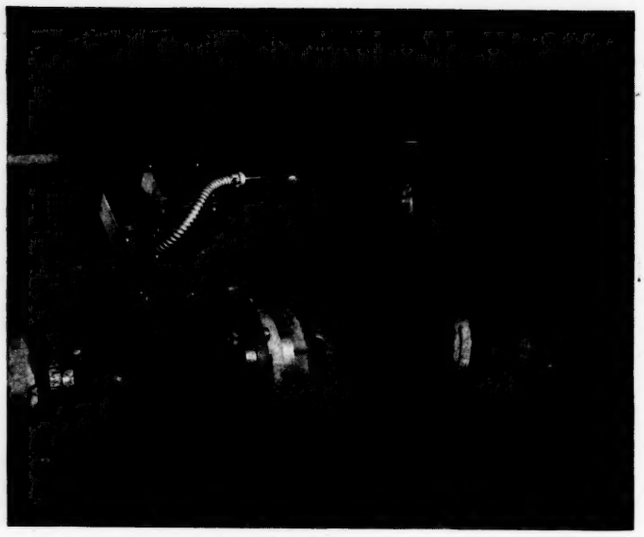


Fig. 1. A 6-in. value installed on an extra long main in a hotel. In order to eliminate noises caused by sudden expansion the valve was set to open in 12 min.

matic valves which can be slowed down so that their opening cycle will take considerable time, thereby allowing enough time for the condensate to drain away or at least be raised to a temperature sufficient to prevent water hammer. Where piping is properly graded, valves seldom have to be set to require more than 3 or 4 min. to open. The degree of control obtainable by opening a valve slowly can be judged by noting that instances have been found where a period of as long as 25 min. was found desirable on a particular zone valve in going from a fully closed to a fully open position. In such cases valves having V-ported discs may prove advantageous, since their flow characteristics make the volume of steam admitted proportional to the amount of lift.

There is another case where slow-opening automatic valves are indicated. This is where, in larger installations primarily, long runs of piping without proper means for expansion may be seriously injured if the automatic valves are allowed to open too rapidly. If this happens, large fittings are endangered because maximum expansion takes place in a very short period of time.

Repeated operations of quick-opening valves will have a tendency to loosen the piping joints, which of course is highly objectionable on all types of vacuum heating systems, thereby causing the introduction of leaks and resulting in more frequent or more rapid operation of the vacuum producing means and sometimes total failure in being unable to secure or maintain a vacuum. While water hammer is the usual cause of operating noise, it is not uncommon even in smaller installations, such as residences, for noises to be set up due to expansion of the piping. Such noises take place where, unfortunately, joints, metal lath, flooring, or other building construction is in direct contact with the piping system. These noises are sometimes quite pronounced and disturbing as the rapidly expanding pipe slips over the building construction with which it is in direct contact. Rarely do these noises or strains occur during cooling, or off, periods as the natural rate of cooling of steel or iron piping is sufficiently slow that the ensuing contraction does not cause difficulty. Here again it is evident that valves which can be slowed down in their opening cycle, thereby causing a slower expansion in the piping system, are highly advantageous.

Boiler Pressures and Priming

A third condition which should be examined when automatic zone valves are used has to do with boiler pressures and water leaving the boiler. Naturally, buildings supplied by large central station steam systems do not present this problem. Some of these difficulties are encountered in all types of boiler installations whether they be hand fired or automatically fired by means of stokers, pulverizers, oil, or gas burners. The situation is especially common in one-pipe systems where returns are not individually check valved.

On installations using one or more automatic valves, where all, or the major part, of the boiler load is under the control of automatic valves it is possible that all valves on the installation will be closed at one time. As a result of the greatly decreased heating load on the boiler the pressure could build up to the point of blowing the safety valve, thereby losing water which is not returned to the boiler and causing danger due to insufficient water in the boiler. Inasmuch as the installation has been made entirely or nearly automatic by the application of zone control valves, manual attendance is lessened, and as a result it is entirely possible that the boiler may lose its water unnoticed. Then, too, when a safety valve blows there is always some damage caused by the live steam coming from the boiler, in injuring boiler and pipe covering, as well as the furnishings and other equipment that may be present in the boiler room, or adjacent rooms. This matter of loss of boiler water is most common in hand-fired installations because of the large firebed present, and the time required for the fire to recede even though it has been very thoroughly checked by means of diaphragm pressure regulators or electric damper controllers. This condition is lessened, though not always entirely eliminated, where the zone valves are arranged, by means of auxiliary switches, to close the draft (or shut off the stoker or burner) just as soon as all zone valves are closed. Even in the case of electrically-ignited burners excessive boiler pressure may be built up, although there is absolutely no combustion taking place in the fire chamber after all the valves are closed. This is due to the stored heat remaining in the brick and steel walls of the fire chamber, and which heat is then transferred to the water in the boiler, thereby generating sufficient pressure to blow the safety valve. This condition can be corrected by the use of a pressure switch operating one of the valves of the zone control system or an auxiliary valve in order to relieve the pressure into the piping system until this pressure has subsided to a safe point, or by operating the boiler under pressure control. In cases where auxiliary switches are used, the circuit from the zone valves to the electric damper controller or automatic firing device can be so arranged that the draft will not open or the automatic firing device be started while one of the zone

valves (or an auxiliary valve) is open to relieve the unwanted boiler pressure. This arrangement may cause a slight amount of overheating in one of the zones for short intervals, and which fortunately usually do not occur frequently, but which is decidedly better and more economical than ruining a boiler.

It is not uncommon to find boilers which are priming, and inasmuch as a zone valve may open when the boiler is under pressure (or a sufficient pressure differential exists between the boiler and the remainder of the system) the rate of steam flow into the system may be sufficiently rapid to entrain such large quantities of water that the boiler will become dry and therefore cause serious damage. Even though a boiler is not priming, water has been known to leave boilers in large quantities when an automatic valve opens too quickly. This most frequently happens on jobs having non-ferrous convector radiators, unit heaters, blast coils, or heating surfaces capable of rapidly condensing large quantities of steam, thereby reducing the pressure or creating a vacuum through the piping system back to the steam and water chamber of the boiler. The water leaves the boiler, not due to priming, but due to the combination of the heat of the fire present in the boiler, the stored heat of the boiler itself, and the heat of the boiler water being rapidly transferred into the latent heat of evaporation, flashing all of the boiler water into steam, usually at pressures less than atmospheric. This condition can be again corrected by choosing automatic valves that can be so slowly opened that the greatly reduced pressure or vacuum is not allowed to go back to the boiler chamber until the pressure condition in the entire system has had sufficient time to equalize.

In fact the loss of boiler water due to flashing has occurred on a few installations where automatic zone valves were not used, but where a large percentage of the heating surfaces of the job were concealed non-ferrous radiators, and where a fast steaming boiler of small water capacity was fired by means of an oversized oil or gas burner. These unusual heating plants could, of course, have their difficulties corrected by the installation of one or more automatic valves having their operators so arranged that their opening period would require from 20 to 25 min.

Fig. 2. This 10-in. automatic valve, when installed in an office building, caused noises due to water hammer until the operating time was increased to 18 min.

Check the Piping

Needless to say, it is also essential when using zone valves on gravity systems to check the return piping system, being sure that the water of condensation can return to the boiler under the various pressure conditions which may arise. Occasionally it is necessary to install automatic valves on the return system operating in parallel to the automatic valves on the supply system, but remembering under these conditions that both the supply and return systems must be connected to the same radiators or heating units. On all heating plants, gravity or otherwise, it is necessary to check for possible cross-connections that may exist in the piping system, and which might ruin the scheme of zones planned for the building. Even in some vacuum systems, the return piping is such that feed-backs from one zone to another are possible.

The foregoing represents some of the important problems facing an engineer or contractor in planning a suitable zone control system for an existing or new building. Considerable thought must be given to pressure conditions which may arise due to the use of automatic valves. It is also readily seen that automatic valves for zone control systems that can have the period of time required for opening easily changed, or adjustable, are distinctly advantageous, and in some instances may represent the difference between a successful zone control system and a failure.

Copper Pipe Used for Soil Heating

EXPERIMENTS conducted at the Alnarp Horticultural Institute are reported in which comparisons were made of artificial soil heating in frames with heating by fermenting the organic material in manure and straw, by steam in clay or wood pipes, and by hot water in copper and iron pipes.

The results of the experiments indicate that both the steam and hot water systems are useful in soil heating, and one or the other may be preferable under difficult conditions.

It was found that the fuel consumption was at least a third lower for the hot water system using copper pipes, but pump operation is necessary. In steaming, the temperature can be raised in a shorter time than by hot water circulation, but the boiler needs more attention when used for steaming than for heating water. It was also found that the steam system can be used for partial sterilization of the soil, as it is possible in a rather short time to raise the soil temperature to 70° C., and even higher.—*Abstracted from an article by J. E. Johansson in Journal of the Ministry of Agriculture (Great Britain).*

Air Conditioned Shops to Speed Up Construction of Huge Telescope

Accurate temperature control necessary in grinding 20-ton lens

STEADY progress is reported on the construction of the 200-in. telescope—by far the world's largest—at the California Institute of Technology. Completion of the giant telescope is expected to permit study and charting of the heavens in very much more detail than has before been possible.

Few scientific construction jobs have ever received such widespread attention as has this one. General features of the telescope are well known. Its main reflecting mirror, with a diameter of 200 in., or nearly 17 ft., is only one of several which must be built. One of these has a diameter of 24 in. and another is 40 in.

While the general facts about the new telescope are generally known it is not so much a matter of common information what an important part air conditioning is expected to play in the processing of the huge glass disc.

With the Institute the party of principal interest in the telescope, it is but natural that the major part of the construction work should take place on its campus at Pasadena. Construction of such telescopes is so highly specialized that no commercial firm would have any object in undertaking the construction, even if it had the facilities to do so.

While the principal construction work is taking place at Pasadena, materials and supplies are being drawn from many sources. A glass casting for the great mirror has already been poured and is now in process of being annealed, preparatory to shipment to Pasadena where the next steps are grinding, polishing, shaping, and silvering. Following completion of the mirrors, construction of the telescope itself will be undertaken.

Preparatory to beginning the actual work on the huge mirror when it is delivered, an optical shop has been built on the campus of the Institute. This is an entirely new building of reinforced concrete and without windows. It was erected especially for the purpose in mind. Its overall dimensions are approximately 80 ft. × 178 ft. This space is divided up into several rooms, one of which is for the handling of the 200-in. mirror, and is called the 200-Inch Shop.

This room is 162 ft. 4 in. × 54 ft. 4 in. wide, with an observation gallery 10 ft. deep at the south end. The clear ceiling height is 38 ft. 9 in. Fig. 3 is an interior view looking toward the windows of the observation gallery at the south end. The 50-ton travelling crane can be seen, as can also the openings near the ceiling for admitting the conditioned air and the grilles near the floor line through which the outgoing air is exhausted.

The exposed walls of this shop are lined with 3-in. cork and the floor with 2 in. of cork. Ceiling consists of 1 in. of insulation on the lower chords of the roof trusses. These trusses form a roof space having a headroom of 8 ft. 9 in. The roof itself consists of 4 in. of concrete with cork insulation. The walls and roofs of the smaller shops in the building are similarly treated.

Construction of the building was undertaken only after a study was made both of the work involved in processing the mirror and also of the most suitable combination of materials available. This general study was under the direction of the firm of Hunter & Hudson, consulting engineers of San Francisco. Much of the data in this article is supplied by F. B. Hunter of that firm, which prepared the plans for the air conditioning installation.

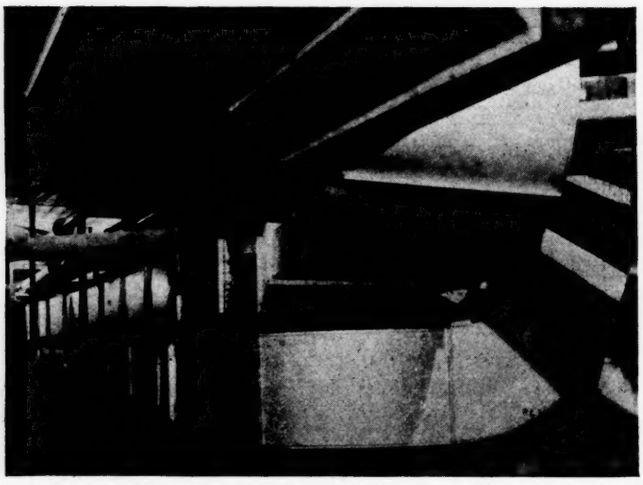


Fig. 1. Distribution ducts above the optical shop

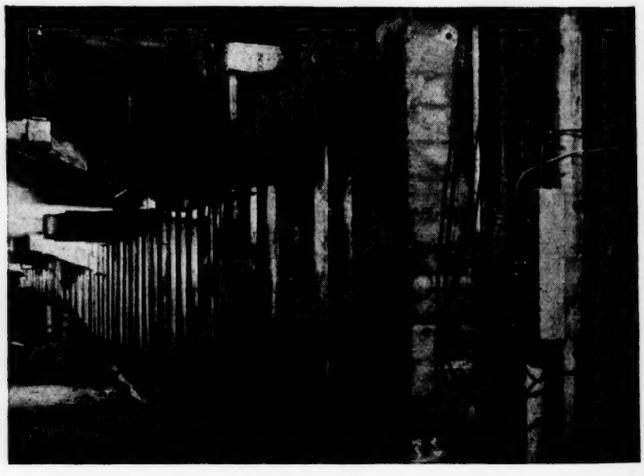


Fig. 2. Another view of ducts before insulation was applied

Grinding the Lens

In order to have a clear understanding of the part which the air conditioning will play it is well to note some of the problems expected to be encountered in the grinding, shaping, and polishing of the mirror.

Experience with other large mirrors, notably the one now in the large telescope at the Mt. Wilson Observatory, shows that the effect of temperature on glass would very greatly affect the accuracy of grinding and also the time required. When it is recalled that the glass disc weighs approximately 20 tons, it can be seen that the mere mechanical handling is no small problem. The method of grinding the disc calls for its being set in a horizontal position during the grinding and then being turned into a vertical position when measurements are made to check up on the accuracy of the work done. Since glass is sensitive to changes in the surrounding air temperature, the glass would be distorted if the disc were ground in one temperature and the grinding were then tested in another temperature. Consequently, it is necessary to keep the temperature steady during the entire time that the mirror is being worked on. This means that the temperature must remain steady throughout all the 24 hr. of each day, and from day to day over a considerable period.

Not only is this true, but since the grinding of the surface must be accurate within very small limits, the tolerance in the temperature change from hour to hour must be very slight. These requirements, together with the necessity of maintaining a high and constant humidity during grinding, indicated at once that the use of air conditioning would not only greatly shorten the time required for grinding but that the plant must be under automatic control.

Air Conditioning Plant

To meet these requirements a complete air conditioning plant was installed. It consists of two parts, one of which supplies the 200-Inch Shop while the other takes care of the smaller shops. The conditioner for the 200-Inch Shop is located in the roof space directly over the shop, while the one for the small shops is in one of the rooms of this portion of the building. Both parts of the plant are essentially alike in plan, principle, and arrangement. Each provides for conditioning the air at a central conditioner and uses sheet metal ducts to distribute and return it. Each contains a fan, and air washer, filters, and air heaters. The equipment operates under automatic control through wet and dry bulb thermostats.

Layout at the conditioners is featured by the use of return air and a bypass. All air is filtered. The return air, part of which goes through the bypass, part through the washer, and part direct to the fan inlet, is so dampered that the washer and bypass receive their requirements, and the excess passes to the fan inlet. Reheaters are located in the bypass duct. Arrangement is made for using electric energy for heating the air at times when steam pressure is not available. An interlock between the steam supply and the electric power lines provides for automatic operation of this feature. A pressure-actuated switch closes the circuit breakers whenever steam pressure falls, and opens them when there is steam pressure. When the heater circuits are energized they supply heat as required, under the control of thermostats connected to the electric heaters. For the 200-Inch Shop the electric heaters are located in the bypass duct at the conditioner, but for the small shops there is an individual electric heater located in each supply duct.

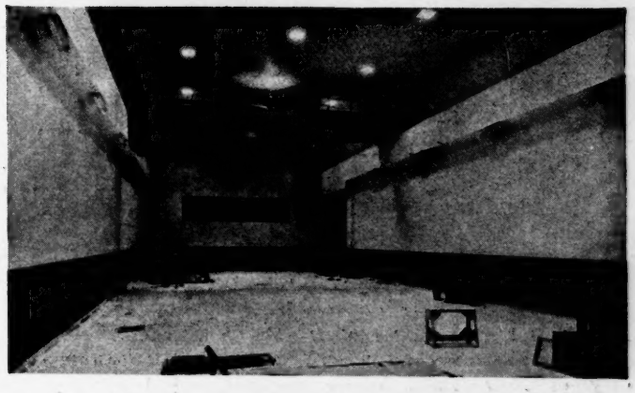


Fig. 3. Interior of optical shop showing supply outlets at ceiling and returns near the floor

Cold Water Supply

Cold water is supplied to the washers by a 60-ton refrigeration apparatus located in the basement of a nearby building. The water is pumped to each washer by pumps located in the machine room. Automatic bypass valves adjust the amount of water in order to maintain the temperature desired at the nozzles, in accordance with load requirements. The refrigeration machine, driven by a 75-hp. slip ring motor, is of the rotary displacement type and uses methyl chloride as the refrigerant. Speed adjustment, secured through a thermostat immersed in the methyl chloride in the water cooler, controls the capacity of the refrigeration machine and permits it to follow the load automatically.

At such times as the outdoor wet bulb is low, no refrigeration is required since the necessary cooling can be secured by evaporation in the washer. An outdoor wet bulb thermostat controls the application of the refrigeration by energizing the refrigeration machine during periods of high wet bulb and shutting it down during periods of low wet bulb.

Distribution ducts, all of which are of galvanized Armco Ingot iron, are located in the roof space above the 200-Inch Shop and in the basement under the small shops. In Fig. 3 the supply outlets at the ceiling can be clearly seen. The air which is discharged at about 600 f.p.m., sweeps across the ceiling, down the opposite walls, and returns across the floor to the return openings which can also be seen in the figure.

The ducts in the roof space are covered with 1 in. of corkboard, as is the fan. The conditioners are covered with 2 in. of corkboard, while steam and cold water pipes are also covered to retard heat transfer.

Standard Oil Stands Pat

on its low price for oil burner installations. N. Y. dealers win a court case concerning departmental jurisdiction.

ONE victory and an apparent deadlock is the standing of the dealers in the oil burner league after a busy November. The victory was in the City of New York, where the oil burner dealers are now released from interference from the Building Department of the city. Sole jurisdiction over oil burner installations was placed in the hands of the Fire Department by a decision handed down by Justice Furman of the Supreme Court of New York, November 14.

On the other hand, "no progress" must be placed on the record in the case of the dealers versus Standard Oil Company of New Jersey, which is not being tried in the courts, but has been referred to the Federal Trade Commission by the dealers.[1] In a reply to a letter from President L. C. Smyth of the National Oil Burner Dealers' Association, Walter C. Teagle, Standard's president, conceded nothing, closed his letter by saying that "It strikes me that we have to meet conditions and that our prices are not destructive in view of the increased number of installations the industry should obtain."[2]

The correspondence between Mr. Smith and Mr. Teagle follows:

Mr. W. C. Teagle,
Chairman of the Board,
Standard Oil Company of New Jersey,
26 Broadway,
New York, N. Y.

Dear Sir:

I am addressing you as spokesman for the National Oil Burner Dealers Association on a matter that vitally affects every member of our Association. We have approached the problem as open minded business men. We have laid aside our every day duties and given time and consideration to the problem.

Early in September the Standard Oil Company of New Jersey announced a price for the sale of oil burners that completely upset the price structure in the industry. Ours is, whether we like to admit it or not, a seasonal business and during the winter months of September, October and November we can get our seed back and lay enough by to operate during the lean winter months.

The action of the Standard Oil Company of New Jersey in announcing the price cut at the time they did was well thought out and well executed if it was the intention of the Standard Oil Company of New Jersey to completely unsettle and disrupt an industry.

The oil burner industry has cooperated with the National Recovery Act and worked in the interest of the provisions of that Act. They have put many more men to work and materially increased their operating costs.

The retail sale of oil burners has been in the hands of a large number of small dealers. The business has not been one that lent itself to mass operation, hence the action of the Standard Oil Company of New Jersey has affected a large number of dealers, their employes and families.

Mr. Lionel L. Jacobs, a vice-president of this organization and president of the Bergen-Passaic Oil Heating Association, on September 28 called on your Mr. Wylie Butler, manager of Fuel Oil Sales, who has charge of your oil burner activities. I am attaching to this letter a copy of Mr. Jacobs' report with the request that you read and give it your consideration.

At a meeting of the Board of Directors of the National Oil Burner Dealers' Association, I was instructed to write you, submitting a copy of Mr. Jacobs' report and to further ask that you meet the writer and a committee of the National Oil Burner Dealers' Association to consider whether it would not be politic and smart for the Standard Oil Company of New Jersey and the National Oil Burner Dealers' Association to work in harmony for the good of the industry rather than divide themselves into two camps with the unprofitable result that usually follows such a decision.

Very truly yours,
NATIONAL OIL BURNER DEALERS' ASSOCIATION,
(Signed) L. C. SMYTH, president.

November 6, 1934

Mr. Leonard C. Smyth,
379 Bloomfield Ave.,
Montclair, N. J.

Dear Mr. Smyth:

Your letter of October 26 received immediate attention, but a reply was delayed because of the absence of Mr. R. G. Steward and some of his associates with whom I wished to discuss the matter.

We are in accord in the feeling that it should be possible to work in harmony for the good of the industry. The dividing point seems to be as to whether this is to be brought about by our going your route or you along ours.

It strikes me that the oil burner industry is repeating the history of electric refrigeration. Both have an almost unl'mited field, because every home is at some point a prospect. In the early days limited volume made the refrigerator pretty much of a luxury. Then along came a host of competing models and lowering of prices. Today the potential field for the refrigerator is many times what it was a few years ago.

In the early days of the oil burner every installation was a separate engineering job and costs high. There followed a period of rapid growth in the types of burners with successive price reductions and the consolidation or abandonment of many agencies.

There is no question now but that low-price burners are going to be sold and the volume should be large enough to make a profit. The development of cheaper burners has been speeded by the competition of gas in some places on terms that exclude oil burners selling on the old basis. The coal people have increased sales of motor stokers materially. This competition makes it impossible for the oil burner industry to proceed as though it occupied an exclusive field.

I am informed that manufacturers have been selling oil burners in this locality at from $250 to $325, a number of them extensively advertising at the lower price. In the midwest the burners sell at from $230 to $275. This seems to support the soundness of the price basis on which we are trying to popularize oil burners. Dealers should be able to prosper by the increased volume they can get selling the lower priced model.

As I spend a large part of my time in Washington where I shall be all of next week, it does not appear feasible to arrange a meeting, but I hope that you will weigh these considerations and let me know if you think this position unreasonable. It strikes me that we have to meet conditions and that our prices are not destructive in view of the increased number of installations the industry should obtain.

Very truly yours,
(Signed) W. C. TEAGLE.

Referring to the dispute concerning the Supreme Court's decision in the case of the New York oil burner installations, NOBDA's executive director Arthur W. Clark said:

"This decision, upholding our contention that the building commissioners had no right to place violations against installations approved by the fire department, not only means that the new dealers' association can make its voice heard but it means freedom for the dealer from political interference. It can be conservatively estimated that sales totaling close to 10,000 units have been held up in the past seven months as the result of so-called violations imposed by the building department over approval given by the fire department."

Represented in court by Irving Heimlich, counsel for NOBDA, the Association used Baerenklau and Company of Brooklyn as a test case and obtained a peremptory writ of mandamus against Edwin Thatcher, building commissioner of Brooklyn, restraining him from any action until the matter could be reviewed by the Supreme Court for a decision.

Meanwhile, although most other types of heating equipment are showing increases in sales over 1933. the oil burner business remains at about a standstill. In September, 14,151 mechanical and natural draft burners were sold, as compared with 14,121 last year. These figures were sharply increased over August, primarily, but not altogether, a seasonal increase. HEATING AND VENTILATING'S Index of Oil Burner Sales, corrected for seasonal trend, rose from 68.4 in August to 71.3 in September. The figures are in per cent of the 1929 average.

Sales figures covering the number of burners sold mentioned above do not include boiler-burner and furnace-burner units, of which there were 1579 sold in September. So far this year, sales of 5683 boiler-burner units and 479 furnace-burner units are reported.

[1]For details concerning the price war begun by Standard, see HEATING AND VENTILATING for November, page 28.

[2]Standard believes the industry should sell 300,000 burners per year. Actual 1933 sales were about 65,000.

The Application of Coal Stokers to Bakers' Ovens

By DAVID LANDAU†

THE baking industry consumes between 1,500,000 and 1,750,000 tons of coal per year, and fuel economies are very important to the baking trade since it produces a product whose sale price is subject to regulation by Federal and State bureaus.

In considering fuel economy it is useful to have an idea of not only what amounts of heat are theoretically required but also the actual amounts needed in ovens heated in various ways.

It may be shown theoretically that about 240 B.t.u. are required to bake 1 lb. of bread. Naturally, this figure is not reached in practice.

Electric bake ovens have been installed which show a heat consumption of about 275 B.t.u. per lb. of bread baked. At usual electric rates this is extremely high-cost heat.

Gas-heated ovens under average circumstances use about 1 cu. ft. of 550 B.t.u. gas per pound of bread, although very carefully constructed ovens have shown consumptions as low as 350 B.t.u. per pound of bread. Oil-fired ovens show consumptions in the neighborhood of 1000 B.t.u. per lb.

Coal-burning, hand-fired ovens produce about 8 lb. of bread per lb. of coal under average conditions, but in exceptional cases with large ovens and watchful attendants combined with good oven insulation, 16 lb. of bread can be baked per pound of coal. A figure of 850 to 950 B.t.u. per lb. of bread baked can be taken for estimating purposes.

Stokers can be relied upon to bake 1 lb. of bread with an expenditure of from 550 to 650 B.t.u. per lb. It is, therefore, quite patent that, compared to hand firing, stoker-equipped bake ovens may show savings of 33% or better. The better the oven, the greater will be the fuel saving. Indeed the baking oven needs as good engineering design as the furnace of the best steam boiler.

Test results have shown that an overall thermal efficiency of stoker and oven of 50% can be reached. In order to be conservative, though, we can set this efficiency as low as 25% and take as a working rule: *A stoker-fired bake oven will produce* 1 *lb. of bread with an expenditure of* 1/10 *of a pound of coal.*

Size and Capacity of Bakers' Oven Stokers

The rule just given, of 1/10 of a pound of coal per pound of bread baked, has been taken from practice—there's nothing theoretical about it. Consequently, it, like all rules based on practice, should be checked against scientific facts and other data, for a rule derived from working ovens may, or may not, always apply to some one particular case or some special oven.

As a check, we may adopt another rule for stoker capacity based on even more aged experience in the baking oven industry. Experience has demonstrated that, in the majority of ovens, *each* 5 *sq. ft. of oven surface will require* 1 *lb. of coal per hour* to supply (1) the heat taken up by the bake and (2) the heat losses of the furnace. This is a second rule for stoker capacity.

There is also a third rule, likewise empirical, which the author has found applicable to finding stoker capacity for bakers' ovens burning from about ½ to 2½ tons of coal per week. It is as follows:

$$C_{hr} = T \times K \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where

C_{hr} indicates the feed capacity of the stoker in lb. per hr.
T is the tons of coal burned per week
K is a factor which varies from 40 for ovens burning ½ ton per week to 25 for ovens burning 2½ tons per week. For values in between, K varies proportionately.

Using the rule of formula (1), a hand-fired oven now burning ¾ ton of coal per week would need a stoker having a capacity of 26 lb. of coal per hour.

When coal stokers are to replace gas-fired equipment we can also find a formula which will give the required size of stoker. Thus it may be shown that if we assume gas having a heating value of 550 B.t.u. per cu. ft., and that the coal used in the stoker has a calorific value of 12,000 B.t.u. per lb., then we may write:

$$C_{hr} = \frac{Cu \times k \times 6}{1{,}000{,}000} \quad \ldots\ldots\ldots\ldots (2)$$

where

C_{hr} = feed capacity of stoker in lb. per hr.
Cu = cu. ft. of gas consumed per month.
k = a factor having same variations as in (1). For approximate calculations k may be taken as 30.

A simple rule, easy to remember, is set up by writing (2) in the form of

$$C_{hr} = \frac{Cu}{5000} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2a)$$

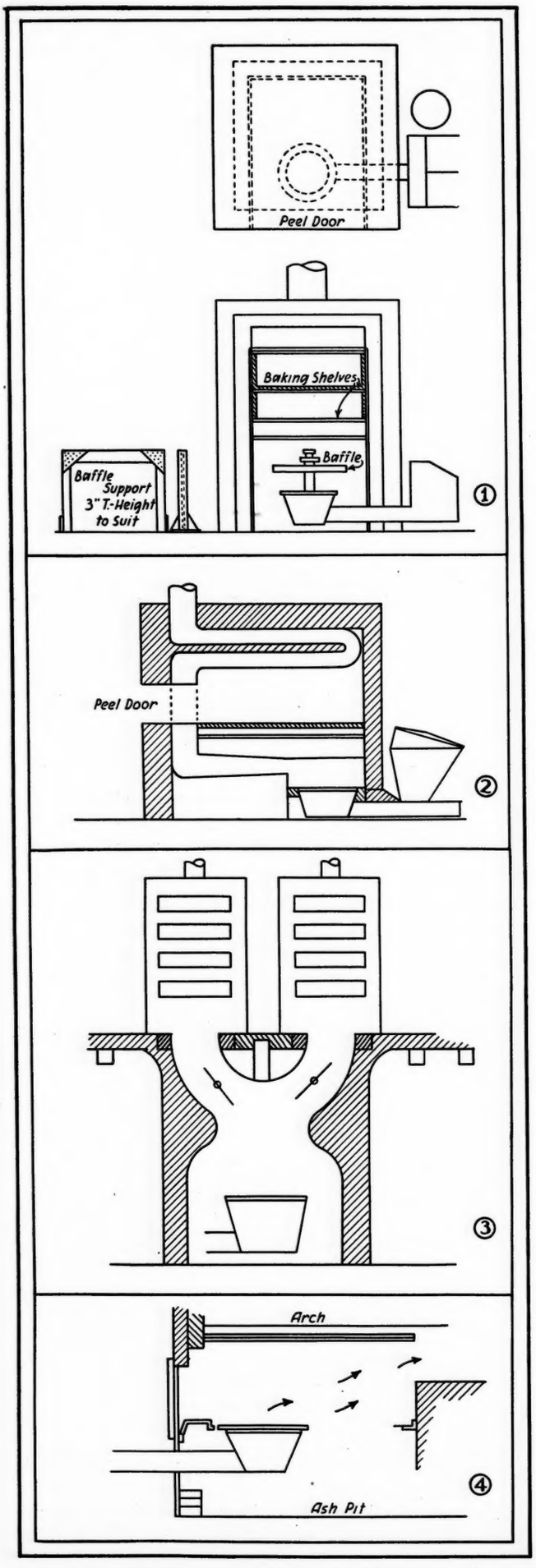
To illustrate equation (2), if we have an oven which consumes 150,000 cu. ft. per month, then the stoker required would have an hourly capacity of:

$$\frac{150{,}000 \times 30 \times 6}{1{,}000{,}000} = 27 \text{ lb.}$$

By equation (2a) we find its capacity as 150,000/5000 = 30 lb.

If we check these approximate formulas from the thermal value of the fuel used we get:

†Engineer, New York.



$$\frac{150{,}000 \times 550}{2000 \times 12{,}000 \times 4} = 0.86 \text{ ton of coal per week}$$

If we now apply formula (1) we will have $0.86 \times 35 = 30$ lb., which is about the same as the result obtained by using the other two approximate formulas.

In any case, a stoker having a capacity to the nearest larger figure should be taken. Thus, if the figures should give, say, 25 and 28 lb. we would use a stoker of 30 lb., if that were the next larger size of the series. The excess is of no importance.

Boilers in Bakeries

Bakers also use steam boilers to supply the humidity in their ovens, required to give glaze and taste to the bread. Many small bakers just throw water on the grates or sprinkle it on the oven floor. This may answer in the smallest installations, but the larger ones use boilers to supply the necessary steam. Bakers' boilers, like other steam boilers, may be stokered by allowing a stoker capacity of 6 lb. per hp. of rating. In most bakers' boilers the capacity is given on the boiler by the maker. If this is missing then any one of the well known rules may be applied to determine the boiler's capacity. One can always be sure of having ample stoker if he allows a stoker capacity based on 8 lb. per sq. ft. of existing boiler grate area. Otherwise the installation is made the same as in house boiler heating.[1]

Types of Bakers' Ovens

Bakers' ovens may be either direct or indirect fired. In the first type the products of combustion enter directly into the baking space, while in the indirect type the gases travel around the baking space either in tile-lined flues or special fire tubes.

Depending on the construction these ovens are also grouped into (1) portable and (2) stationary (or brick set) ovens. It should not be inferred that the portable type can be carried away as easily as the name would indicate. It is simply so called because it is made of standard parts which can be carried to the place of erection. Some portable types contain several thousand bricks.

Bakers' ovens are also designated in categories as follows: reel ovens, draw plate ovens, rack ovens, travelling hearth, travelling tray, rotary ovens.

Depending on where the firing door is located, they are also designated as (1) front fired, (2) rear fired, (3) side fired, (4) basement fired. The last indicates that firing is done through a door located in the basement.

[1]See HEATING AND VENTILATING, October, 1934, page 48.

Fig. 1. Small portable or hubbard oven. Fig. 2. Heavy duty portable oven for small wholesale bakeries. Fig. 3. Oven with combustion chamber in basement to save floor space. Fig. 4. Front-fired "Patent" oven

Installation of Stokers in Bakers' Ovens

Small portable ovens, also known as "hubbard" ovens, are either gas or coal fired and can be readily converted to stoker firing. As illustrated in Fig. 1 a brick "baffle" is suspended at a height at least equal to the stoker firepot diameter. The firepots in these ovens are usually of cast iron and are placed on the floor of the oven. A single stoker retort may be located between the firepots and this is usually ample. If a single stoker is installed, the smoke pipe leading from the firepots to the vertical portion inside the oven must be removed, leaving the ends open.

Heavy duty portable ovens, often used by small wholesale bakeries, are usually direct fired, having fireplaces either in front or at the rear, as shown in Fig. 2. It is practically impossible to install a stoker in the front since it hinders the baker from loading or unloading his oven. Stokers are therefore installed either on the side or in the rear. The stoker controls, on the other hand, are placed in front of the oven, so that the baker may easily control his heat without having to go around the stoker.

In small bake shop installations space is a very important item. It is, therefore, sometimes necessary to build a Dutch oven and use the combustion gases to heat the baking oven. In other cases the combustion chamber is located in the cellar and flues are carried to the baking chamber, or oven, as shown in Fig. 3.

In the "Vienna" oven, often called the American type, which is direct fired, the grates are on the baking floor level in the baking chamber. Firing is usually done through the peel door, that is to say, the door through which the bread is loaded and unloaded, when hand fired. Bakers demand that the stoker retort be placed with the burner at the same level as their old grates. This is not at all necessary and heat distribution may be obtained, when stoker fed, by proper control dampers.

The so-called "Patent" oven has fire tubes or flues built around the block chamber and with this construction the furnace and stoker may be located wherever most convenient. When located on the peel side it is called a front fired, when in the rear it is a rear fired, and is called a side fired if located on either side—right or left. It is essential when installing a stoker in such ovens to be sure of the clearance space between burner and oven arch (see Fig. 4). The minimum space between burner and arch should be 30 in. The dampers must never be completely closed so as to produce a positive pressure in the oven. The dampers should have a hole cut in them so that a negative draft is as-

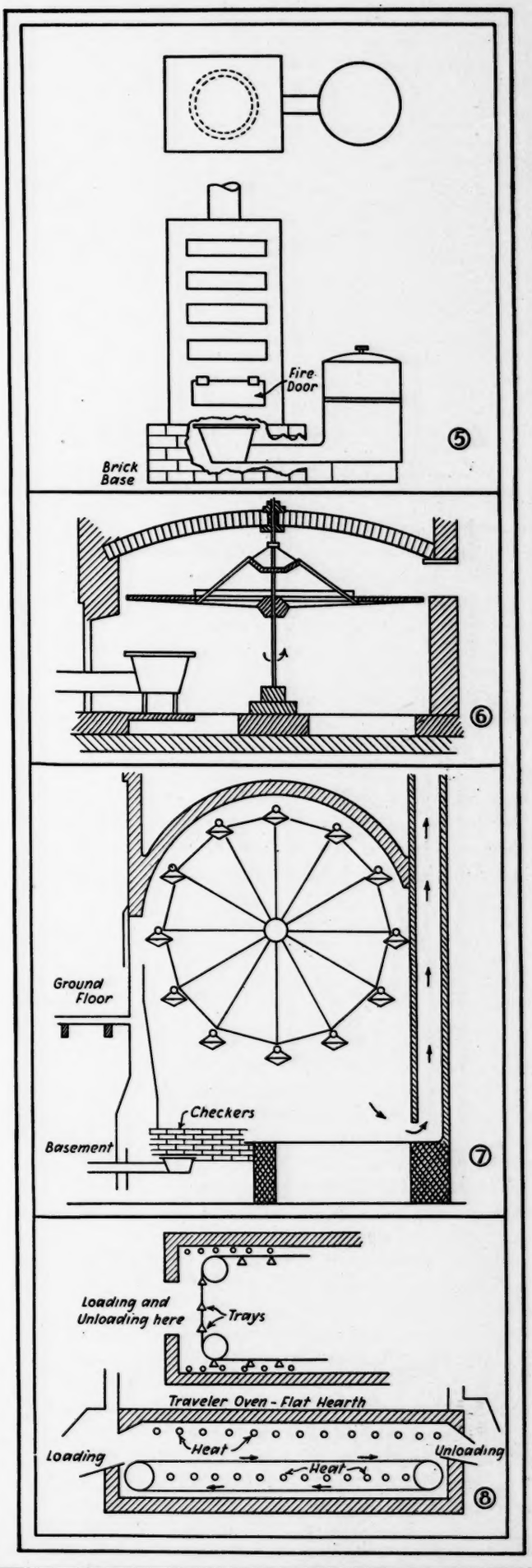


Fig. 5. A small portable Rack oven. Fig. 6. A rotary oven. Usually requires two stokers. Fig. 7. A Reel oven which is used to produce biscuits or wafers. Fig. 8. Large Traveler oven. May use as many as six stokers.

sured under the worst conditions. Cleaning of the flues must be done regularly or else the gas passages or smoke pipe may soon be found clogged from fly ash, and positive pressure with its attendant evils ensues.

Rack ovens of the small portable type are easily changed over to stoker firing. A hole is cut in the bottom and a brick foundation built and the whole stoker set on it. The fire door must be made large enough to insure the entrance of the retort head of the stoker (see Fig. 5).

With big rack ovens conditions are more difficult. These ovens are heated by high-pressure steam (superheated steam). A great number of steel tubes each of which contains a small quantity of water, and hermetically sealed, are placed in the combustion chamber. The heat raises the temperature of these tubes to about 500°, at which temperature the water is under a pressure of 600 lb. per sq. in. Heavy duty ovens of this type have fire boxes whose length is about 6 ft. and whose width is 1½ ft. Several stokers may be required in one oven.

Rotary ovens (Fig. 6) usually take two stokers. One of the stokers furnishes heat to the under side and the other to the upper side of the oven floor. The oven floor is usually a large soap stone slab and as it rotates it is heated all over in passing the stoker retort. Many of these ovens are now gas fired.

Reel ovens (Fig. 7) are used by bakers who produce biscuits, wafers, breakfast goods, and similar products. They are direct fired and are generally built for either coal or gas. The stoker must invariably be pitted, a deep pit often being required. In other instances a Dutch oven may have to be constructed outside the oven. It is usually necessary to "baffle" the entire lower portion with brick checker work, so as to obtain an even heat distribution. Most frequently these ovens are basement fired and need stokers of from 60 to 100 lb. capacity per hour.

Traveller ovens (Fig. 8) are large indirect fired ovens fitted with as many as six fireplaces, each of which may burn 100 lb. of coal per hour. Some of these ovens are heated by the steam tube method. Each fireplace must have its own stoker installation.

Precautions

Stokers must not be installed in a newly built oven. It requires several months to dry out a new oven and this drying is best accomplished by hand firing. If a stoker is installed at once then it must be allowed to function slowly until the drying is assured without causing cracking.

When portable ovens are changed over to stoker firing the floor must be insulated by hollow tiled floor insulation. This is extremely important if, as is often the case, the oven stands on a floor of wooden beams.

The ordinary boiler stoker will usually be found too short for bake oven installation, and it is essential that the feed screw and ash collectors be made of a suitable length to accommodate the particular oven.

In bake ovens using indirect heat it will often be advantageous to install bituminous equipment. When anthracite burners are installed and are entirely enclosed in brick settings they will be subject to very high temperatures. Such installations have given considerable trouble from the rapid burning away of the retort parts. This has now been overcome by making these retorts in a special heat-resisting alloy. Nothing else should be accepted in their stead if one wants to be trouble-free. They cost more and are usually worth the difference in price.

The Incinerator Nuisance

IN view of the fact that incinerators (so-called) installed in apartment buildings are incinerators in name only and utterly fail to accomplish the purpose intended, it is time that municipalities took action to define what shall constitute incinerator construction.

The office and object of an incinerator is to destroy garbage and other waste material by burning; such destruction to be accomplished without the emission of dense smoke, noxious odors, or unburned particles from the stack, and in order to do this a temperature of at least 1400° must be maintained in the furnace, a sufficient amount of air introduced into and mixed with the volatiles being distilled off the fuel bed, and the intensity of the fire controlled sufficiently to allow complete combustion. With very few exceptions the "incinerators" being installed locally, and I dare say the same condition exists in every city, are nothing but brick boxes containing a grate with the upper side connected to a combination flue and chute.

Incinerators which will function as they are presumed to be intended, must be constructed with a secondary furnace in which a hot fire is maintained with a smokeless fuel; coke will serve excellently.

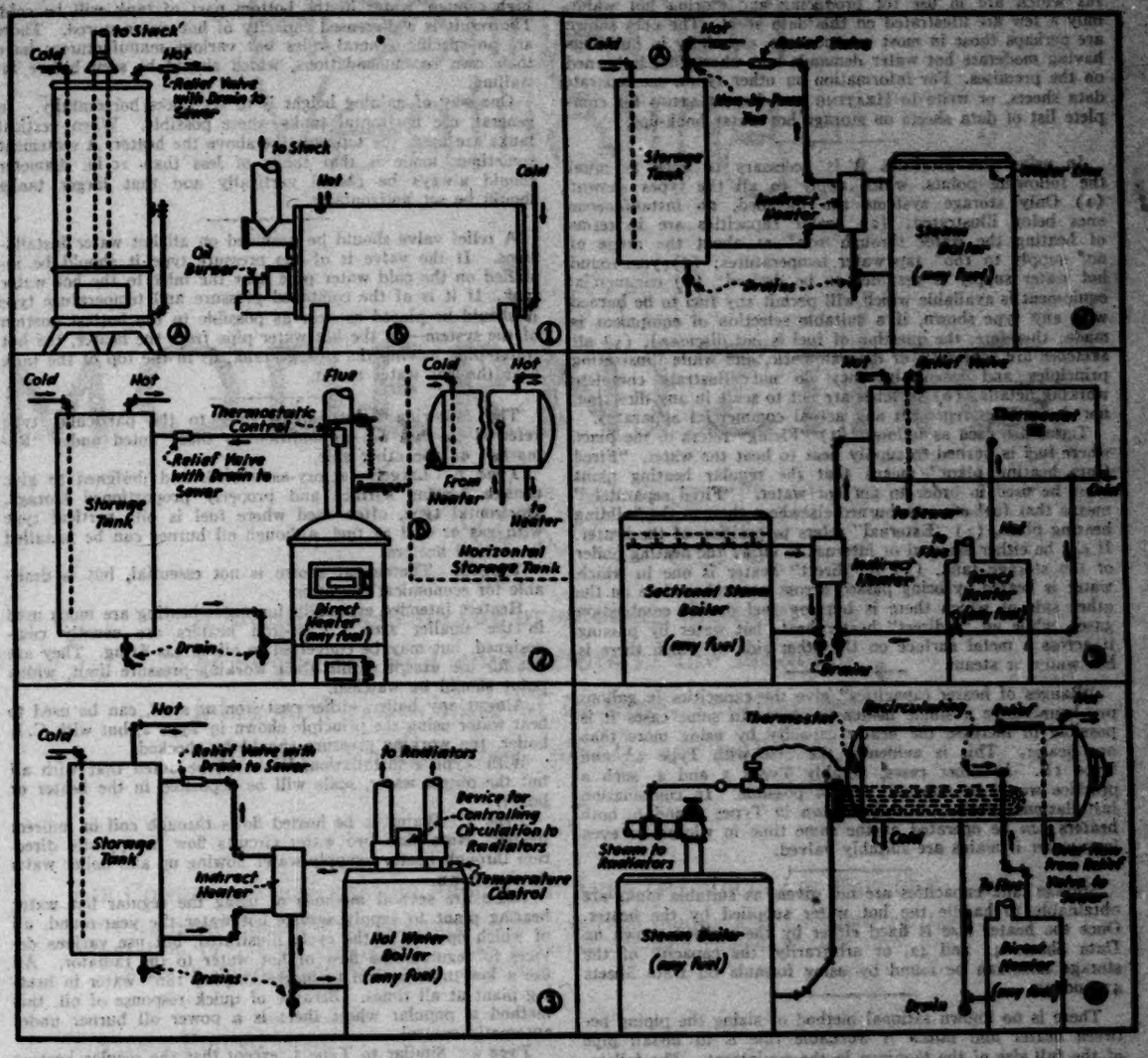
The garbage chute leading to the rooms above is connected to the top of the primary furnace. The flue damper control is connected to the top of the secondary furnace with a checkered firebrick wall between the two furnaces.

The operation of an incinerator constructed as above described is as follows: Build a fire in the secondary furnace and raise the temperature to the desired degree before lighting the garbage in the primary furnace. Gas and odors from the garbage must then pass through the checkered firebrick wall into the zone of extreme heat before entering the flue and will be completely consumed. After the secondary furnace is heated the combustion rate may be controlled by the damper in the flue.—*Gordon D. Rowe, Chief Smoke Inspector, Cincinnati, Ohio, in "Smoke" for September,* 1934.

HOT WATER SUPPLY DATA—2

Diagrammatic connections of storage systems

Buildings having moderate hot water demands, and fuel burned on premises.



TYPE 1: FIRED SEPARATELY, DIRECT HEATER AND TANK COMBINED.

Typical Application: Small water demand, operates independent of heating plant.

Range of Capacities (gal. per hr.): 20-100.

Remarks: Easily set up. Obtainable with either ferrous or non-ferrous tank, with or without insulation or automatic controls.

TYPE 2: FIRED SEPARATELY, DIRECT HEATER WITH SEPARATE TANK.

Typical Application: Any water demand, independent of heating plant.

Range of Heater Capacities (gal. per hr.): C.I. water heater 20-250; multi-coil water heater 20-500; steel boiler — to 10,000; C.I. boiler — to 7500.

Remarks: Heaters should not operate at pressures greater than safe working pressure (usually stamped on). Common figures are: for C.I. water heaters, 40 lb.; for C.I. boilers, 30 lb. Other heaters will usually operate on full water pressure.

TYPE 3: FIRED FROM HOT WATER HEATING PLANT, EXTERNAL INDIRECT HEATER.

Typical Application: Small to medium water demand, dependent on heating plant and automatic maintenance of water temperature.

Range of Heater Capacities (gal. per hr.): 10-1000.

Remarks: Uses a water temperature low limit control to keep boiler water above 150° throughout the year, and a control to regulate flow of hot water to radiators.

TYPE 4: FIRED FROM STEAM HEATING PLANT, EXTERNAL INDIRECT HEATER.

Typical Application: Small to medium water demand, dependent on heating plant and automatic maintenance of minimum water temperature or minimum steam pressure.

Range of Heater Capacities (gal. per hr.): Tapped above water line (atmos. steam) 50-20,000. Tapped below water line (180° water) 10-1000.

Remarks: Uses limit control to keep boiler water temperature at about 180° when heater is tapped below water line. Alternate arrangement keeps slight steam pressure in boiler and uses regulating device in steam main.

TYPE 5: COMBINATION OF TYPES 2 AND 4.

Typical Application: Small to medium water demand, uses heating plant in winter and independent in summer.

Range of Heater Capacities (gal. per hr.): Indirect heater—same as 4. Direct heater—same as 2.

Remarks: Direct heater can be used as booster when water demand is excessive or as sole source of heat when heating plant is out of operation, as in summer.

TYPE 6: COMBINATION OF TYPE 2 WITH STEAM BOILER HAVING HEATER SUBMERGED IN TANK.

Typical Application: Any water demand, uses heating plant in winter and independent in summer.

Range of Heater Capacities (gal. per hr.): Submerged heater 50-25,000. Direct heater—same as 2.

Remarks: For any given size storage tank a number of heating elements are obtainable. Submerged storage heaters also available for use with external steam.

HOT WATER SUPPLY DATA—2

Diagrammatic connections of storage systems

Buildings having moderate hot water demands, and fuel burned on premises.

Of the many types (and combinations of types) of apparatus which are in use for producing and storing hot water, only a few are illustrated on this data sheet. The ones shown are perhaps those in most common use, especially in buildings having moderate hot water demands and where fuel is burned on the premises. For information on other types, see separate data sheets, or write to HEATING AND VENTILATING for complete list of data sheets on storage hot water hook-ups.

In using the diagrams it is necessary to keep in mind the following points, which apply to all the types shown: (1) Only storage systems are included, no instantaneous ones being illustrated; (2) heater capacities are in terms of heating the water through 100° at about the range of 60° supply to 160° tap water temperatures; (3) year-round hot water supply is assumed to be desired; (4) commercial equipment is available which will permit any fuel to be burned with any type shown, if a suitable selection of equipment is made; therefore, the question of fuel is not discussed; (5) all sketches are schematic or diagrammatic, and while illustrating principles and essentials, they do not illustrate complete working details; (6) sketches are not to scale in any direction, nor do outlines represent any actual commercial apparatus.

Terms are used as follows: (1) "Firing" refers to the place where fuel is burned to supply heat to heat the water. "Fired from heating plant" means that the regular heating plant must be used in order to get hot water. "Fired separately" means that fuel must be burned elsewhere than in the building heating plant. (2) "External" refers to position of the heater. It can be either external or internal to either the heating boiler or the storage tank. (3) A "direct" heater is one in which water is heated by being passed across a metal surface on the other side of which there is burning fuel or hot combustion gases, while an "indirect" heater heats hot water by passing it across a metal surface on the other side of which there is hot water or steam.

"Ranges of heater capacities" give the capacities in gallons per hour where a single heater is used. In some cases it is possible to increase the heater capacity by using more than one heater. This is evidently the case with Type 1A and Type 1B. In other cases, notably Types 3 and 4, such a practice would be unusual, though possible. In combination installations, similar to those shown in Types 5 and 6, both heaters can be operated at the same time in winter, or even in summer if mains are suitably valved.

Storage tank capacities are not given, as suitable tanks are obtainable to handle the hot water supplied by the heater. Once the heater size is fixed either by the method shown on Data Sheets 41 and 42, or arbitrarily, the capacity of the storage tank can be found by using formula on Data Sheets 41 and 42.

There is no known rational method of sizing the piping between heater and tank. A workable rule is to install pipe of the full size of the tappings in the equipment. The following schedule, based on heater capacity, is sometimes used.

GAL. PER HR.	PIPE SIZE
25-40	¾
40-80	1
80-125	1¼
125-200	1½
200-350	2
350-500	2½
500-800	3
800-1500	3½
1500-2000	4

Pipe size is important because it influences temperature of the water in the storage tank, especially where the heater is external to the tank. The larger the pipe size, the less the frictional resistance and the faster the flow becomes. The faster flow results in a lower temperature rise. The tendency is for the whole tank to be filled with warm water. With small pipes, rate of flow is restricted, temperature rise is increased, and a layer of hot water is stored in the top of the tank.

In fitting pipe, the usual rules should be followed, especially in allowing for adequate expansion of the piping and for sloping toward drain points.

In planning an installation the height of the tank above the heater is important. The higher the tank can be set the greater head there is for circulation. This tends toward fast circulation with low temperature rise. To balance this, small pipe sizes can be used.

Additional point about tank height is that unless placed high enough, water in the bottom part of tank will be cold. The result is a decreased capacity of hot water stored. There are no specific general rules but various manufacturers have their own recommendations, which should be seen before installing.

One way of gaining height is to set tanks horizontally. In general, use horizontal tanks where possible. When vertical tanks are used, the top must be above the heater. A statement sometimes made is that tanks of less than 20-in. diameter should always be placed vertically and that larger tanks should be set horizontally.

A relief valve should be provided on all hot water installations. If the valve is of the pressure type it should be installed on the cold water pipe near the inlet to the hot water tank. If it is of the combined pressure and temperature type it should be placed as near as possible to the hottest portion of the system—on the hot water pipe from the heater, the hot water pipe leaving the storage tank, or in the top of the tank near the hot water outlet.

The following points apply only to the particular type referred to, and are in addition to those noted under "Remarks" on the other side.

Type 1. Largely factory-assembled, and designed to give enough heating surface and properly proportioned storage. Horizontal type, often used where fuel is oil; vertical type with gas or coal as fuel, although oil burner can be installed in vertical heaters.

Type 2. Thermostat shown is not essential, but is desirable for economical operation.

Heaters intended especially for water heating are much used in the smaller sizes. Cast-iron heaters are usually coal-designed, but may be converted to oil or gas firing. They are not for use except within their working pressure limit, which point should be watched.

Almost any boiler, either cast iron or steel, can be used to heat water using the principle shown in Type 2, but with C. I. boiler, the working pressure should be checked.

With Type 2 installation, it should be noted that with all but the purest water, scale will be deposited in the heater or boiler.

Type 3. Water to be heated flows through coil in indirect heater. Note that two water circuits flow in opposite direction through heater—supply water flowing up and boiler water flowing down.

There are several methods of using the regular hot water heating plant to supply service hot water the year-round, all of which operate in the cycle illustrated, but use various devices to regulate the flow of hot water to the radiator. All use a low limit control to insure keeping 180° water in heating plant at all times. Because of quick response of oil, this method is popular where there is a power oil burner under automatic control.

Type 4. Similar to Type 3, except that the regular heating system uses steam, vapor, or vacuum instead of hot water. Alternate location of heater inside boiler, either above or below the water line.

Where heater is above water line, control must be used to keep slight steam pressure so heater will be surrounded by steam, and there must be device in steam main to radiators to keep steam from entering the heating system in summer.

When heater is below the water line, control is used to keep boiler water at temperature of about 180° during periods when heat is not wanted in radiators.

A method of connecting the hot water heater pipe to the storage tank is shown at *A*. This can be used where it is not possible or desirable to make the connections as shown in the previous cases. A non-by-pass tee is installed to prevent the cold water from the bottom of the tank from being drawn up through the heater piping and mixing with the hot water.

Type 5. A combination system using both steam heating boiler and direct heater for supplying the hot water. When the steam boiler is in operation the direct heater operates only when there is an abnormal demand for hot water. When the steam boiler is shut down the direct heater goes into operation. A direct acting thermostat installed in the tank controls the operation of the direct heater.

This sketch also shows a method of connecting an indirect heater to a sectional steam boiler by tapping all of the sections. This arrangement provides good circulation of the boiler water from all sections of the boiler and prevents steaming during the summer months.

Type 6. In this method, steam is used to heat water through the medium of a coil submerged in the storage tank. A thermostat controls the flow of steam to the coil. When no steam is available the direct heater is put into operation.

Heating and Ventilating

MODERNIZING

A monthly section for promoting the interests of engineers and contractors in the modernizing and renovizing of heating, ventilating, and air conditioning plants in buildings.

AIR CONDITIONING EXTENDS PRODUCING AREA OF CHOCOLATE FACTORY 28

Prominent chocolate manufacturer added air conditioning and increased refrigeration to one of his factories. As a result his modernized factory now has twice as much production area as before.

ON THE FIRING LINE

Modernizing work is not confined to small jobs nor do only small operators go after it. Here are stories of how two firms of consulting engineers and two contracting firms have found this kind of work—and found it helpful.

LARGE CONTRACTOR FINDS MODERNIZING WORTH GOING AFTER 30

CARD FILES OF OLD JOBS LOCATE MODERNIZING WORK 31

ENGINEER FINDS MODERNIZING IN AIR CONDITIONING AND ZONING 32

PERSONAL CONTACTS BRING MODERNIZING TO ENGINEERING FIRM 33

TITLE II OF HOUSING ACT LAUNCHED 34

An outline of the second part of the National Housing Act which is expected to release frozen private capital for the building of homes, resulting in an increase in construction work for contractors in these types of buildings.

Air Conditioning Extends Producing Area of Chocolate Factory

DURING 1934, Blumenthal Bros., manufacturers of chocolate and cocoa, put three central air conditioners into their No. 2 plant located at Bridesburg in the Philadelphia area. As a result this modern plant, exterior of which can be seen in the foreground of Fig. 1 on opposite page, has a modern conditioning job on each of its three floors. Additional equipment in the way of pumps, motors, refrigeration, and a new cooling tower accompanied the conditioning apparatus. All the auxiliary services and equipment are located in the power plant building shown in Figs. 3 and 4, from which refrigeration, water, steam and electric power are furnished to both Plant No. 2 and also to Plant No. 1, visible in the background of Fig. 1.

Now chocolate products are wrapped (Fig. 2) on the first and second floors in a temperature of 65° and a relative humidity of 50%, at the same time that first floor offices are kept at 70° and 40% R.H. On the third floor it is necessary to keep a temperature of from 52° to 60° and R.H. of 50% because of the perishables stored there, including dried buttermilk, raisins and nuts. The third floor temperature control is so arranged that the temperature can be varied from one limit to the other.

The building, Plant No. 2, is 400 ft. long x 80 ft. wide, and at present about half the total floor space is conditioned, although it is expected that eventually most of the area will be so treated. The conditioned area on each floor is approximately 200 ft. x 80 ft. at present, and a central conditioner on each floor supplies conditioned air which is distributed in ducts, part of which can be seen in Figs. 2 and 5. To reduce the heat load and save refrigeration, the conditioned portion of each floor is enclosed by partitions built of 4-in. tile, 2-in. cork, and ½-in. plaster on each side. The roof also is insulated with 2-in. of cork and windows are equipped with double sash.

Conditioning Equipment

Dehumidification and cooling being the principal duties which the system is required to perform, the conditioners are really dehumidifiers. Each is of special design and takes into account the nature of the processing on each floor and nature and variation of the load. On the first floor the air which goes to the offices comes directly from the conditioner at a temperature of about 44° and is heated by an air heater in the ducts to the temperature desired. The part of the air which goes to the packing and wrapping area is discharged through ducts to this section which, as noted, is kept at a temperature different from that maintained in the offices. As there are no offices on the second and third floors the problem of two temperatures was not present there. For the first and second floors each conditioner handles 15,000 c.f.m. while the one on the third floor uses 17,500 c.f.m. Those on the first two floors use 192 g.p.m. of spray water, and the one on the third floor uses 294 g.p.m. Two sets of spray nozzles are provided in the machines on the lower floors, with three sets on the upper machine. All maintain a 25-lb. nozzle pressure. To produce the cold water within the dehumidifiers an ingenious counterflow device is employed—water flowing downward and ammonia upward. The insulated accumulator, insulated piping, screens on air returns and controlling instruments can be seen in Fig. 5. All three dehumidifiers are set on a 2-in. cork mat laid in asphaltum cement and completely insulated with 2-in. sheet cork covered with ½-in. Portland cement. The cold water centrifugal pumps and piping are completely insulated with 2-in. moulded cork covered with heavy canvas sewed and enameled. Fig. 6 shows the high capacity conditioner on the third floor.

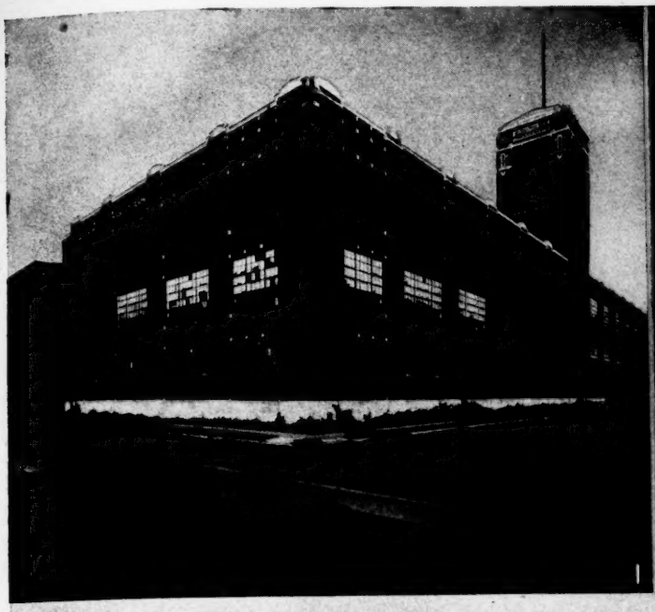
Refrigerating Machinery

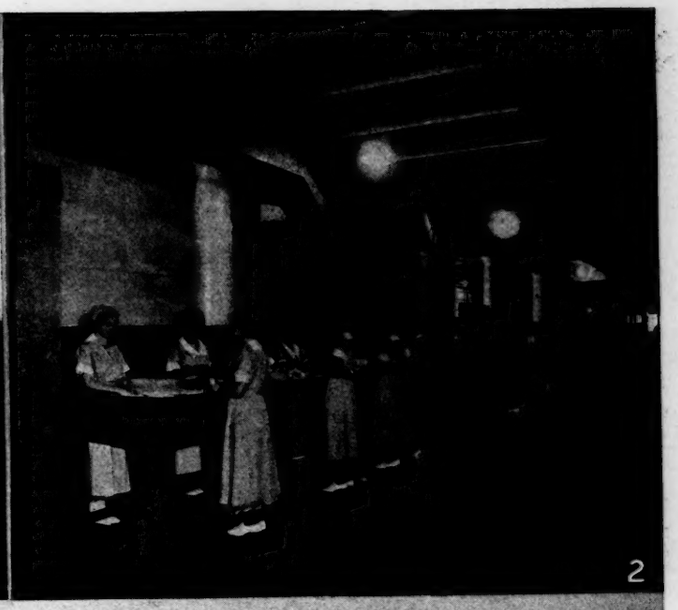
In Figs. 3 and 4 can be seen the principal items of refrigerating apparatus. Fig. 4 shows the new 1000 g.p.m. cooling tower and the vertical shell and tube condenser, which is 42 in. in diameter and 16 ft. high. The concrete tank beneath the condenser was made large enough for another condenser of equal size in the event of future abandonment of the old condenser which is still being used.

In the central foreground of Fig. 3 are two vertical duplex 10-in. x 10-in. compressors, driven by a single direct-connected 250-h.p., 300 r.p.m. engine type synchronous motor, which is placed between the two compressor units. The compressor is lubricated by a forced feed oiling system. The motor is excited by a 5-kw. motor generator set.

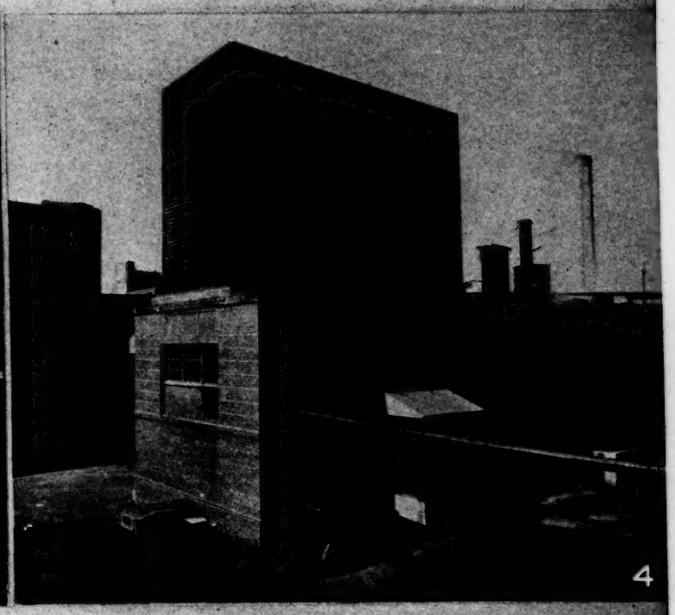
The plant has been made so ideally flexible that when desired the old refrigerating plant can be used simultaneously with the new plant, the old steam-driven ammonia compressor being visible in the background of Fig. 3 behind the new compressors. The piping hookup is such that the compressors can be operated on either 40-lb. or 20-lb. suction pressure. With the preferable 40-lb. suction pressure the new ammonia compressors have a capacity of 192 tons of refrigeration, which, together with the 95 tons capacity of the old compressors gives a total of 287 tons for handling future peak loads. It is planned that a load of 81 tons will be added in the future, which, during peak periods, will make it necessary to use the combined capacity of all compressors. In other words, the present arrangement makes it possible to operate any cylinder of the new compressors on either the high suction pressure from the new dehumidifiers, or from the low pressure of the old system. In fact, it is possible to operate some or all of the cylinders of the new

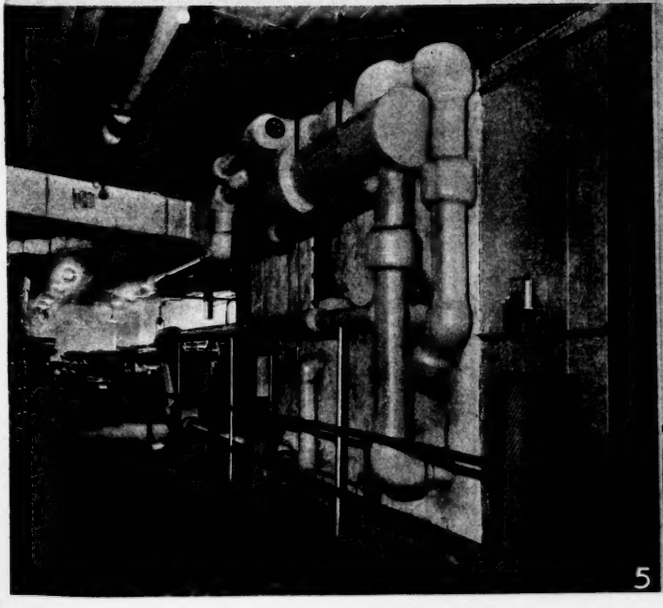
(Text concluded on page 68)

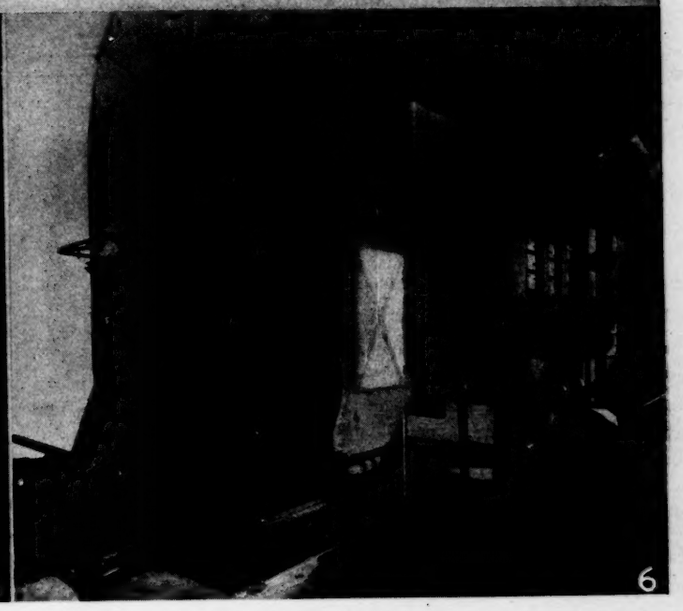

1


2

3


4


5


6

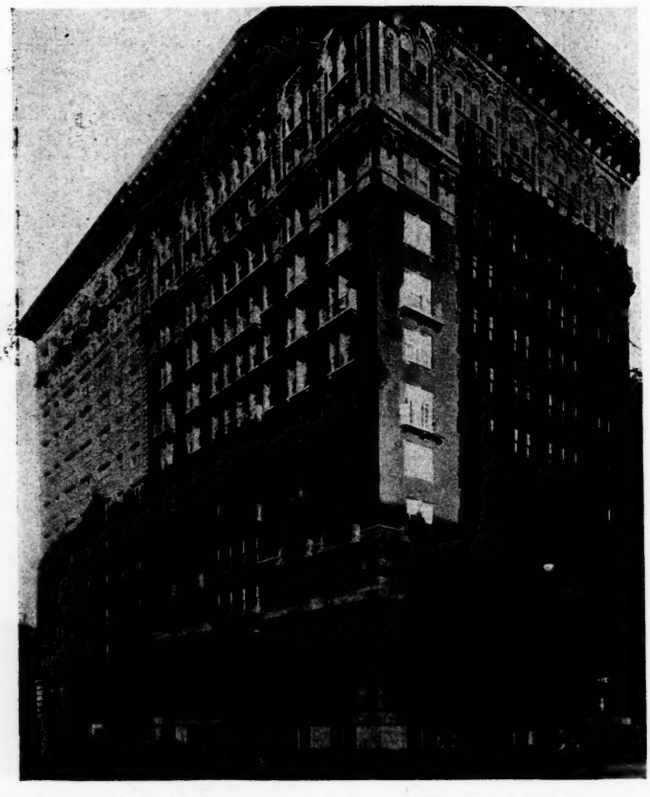
ON THE FIRING LINE

Practical, usable, and result-getting methods and experiences in getting business

Large Contracting Firm Finds Modernizing Work Worth Going After

Here is the story of a heating and ventilating contractor who was faced with a serious situation during depression years because of an organization that was fully prepared for large projects, with a huge overhead, at a time when comprehensive contracts were non-existant. His city warehouse to house tools, supplies, trucks and like equipment is some 300 ft. long by 125 ft. wide. For the last four years most of the equipment has been gathering dust and the overhead expense has made decided holes in reserves. Acceleration on modernization even now is beginning to convert loss to profit on the ledgers.

There have been awarded recently several Federal, County, and Municipal contracts that have enabled the contractor to brush the dust off his tools and equipment and make them active once more. Public building work has become important. A recent hospital job was a $1,000,000 contract for heating and ventilating. This type of work has superseded power plant work, in which the firm specialized previously. Although new construction still affords the largest contracts in dollars, the most profitable contracts are those involving modernization.



Remodeling large suites into smaller apartments resulted in considerable heating work for an alert contractor

For example, an apartment house on West End Ave., New York, found it impossible to rent large apartments. So they remodeled most of the building into some 150 small apartments which have rented more easily. This involved considerable remodeling of the heating. A costly Fifth Avenue mansion was converted into an antique museum and this required many heating and ventilating changes. Tenement rebuilding and reequipment is another modernizing line that has proved very desirable. Experience revealed that availability of cheap rentals in well heated buildings has made it now virtually impossible to rent tenements without adequate heat. In some cases single owners held entire blocks of such tenements and are now improving them as to heating. Much of this work has come to the contractor here discussed through the real estate interests.

No concealment need be made of the fact that large contractors such as this one continue to secure most of their work through the regular channels. To companies organized with 300-ft. buildings and a million dollars worth of equipment, small contracts are, in general, not welcomed.

Whereas the small contractor can secure a fair volume of business by what might be termed "modern merchandising" methods, this large contractor has secured business in other ways. This involves frequent use of the mails, personal influence of old friends and customers, personal contacts with architects and engineers, and a good reputation. This last has been achieved over a period of many years. Engineers must be kept acquainted with the ability of such contractors to handle large projects. Hence, this contractor, set up for large work only, must use the foregoing methods and he has used them tellingly.

Advice on how to obtain business, in this example, may be less potent than cautionary suggestions, says this contractor. For instance, in estimating tenement heating work basement head room is an important feature. Many cellars do not have enough head room to receive a properly sized boiler. This means excavation and new basement planning, features not usually revealed in plans and specifications. To avoid loss it is best to visit the property before bidding.

Another warning given by the contractor is not to spend too much time on estimating, surveying, and superintending on modernizing jobs. Structural limitations often make it impossible to figure costs accurately. It is better to make "intelligent guesses" and make prices high enough to cover all contingencies. Unless this is done profit is likely to be absent under forced competition, and loss introduced instead. If

there is too much estimating, surveying, and superintending it is difficult to earn profits, these being consumed in overhead. If competition forces prices down too low to earn profit it is best not to try to secure the work.

Welding, this firm feels, can profitably be used in modernization contracts. The blow torch and electric arc have made it possible to introduce pipe and fittings in places where from lack of room screw and flanged fittings might require tearing out large sections of walls, ceilings and floors, which often need not be done with welded work.

While preferred classes of prospects are not strongly marked now, the contractor suggests public buildings, hospitals, hotels, apartments, factories, and mercantile buildings as offering brightest opportunities, with air conditioning and heat zoning as leading subjects. Constant visits on those who have the authority to let the work is the best way to secure opportunities to bid and offer the best chance of securing contracts on non-competitive projects.

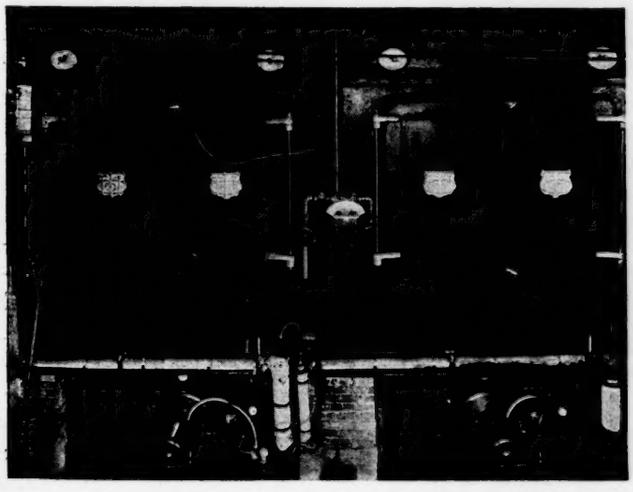
Firm—Almirall & Company, New York, N. Y.

●

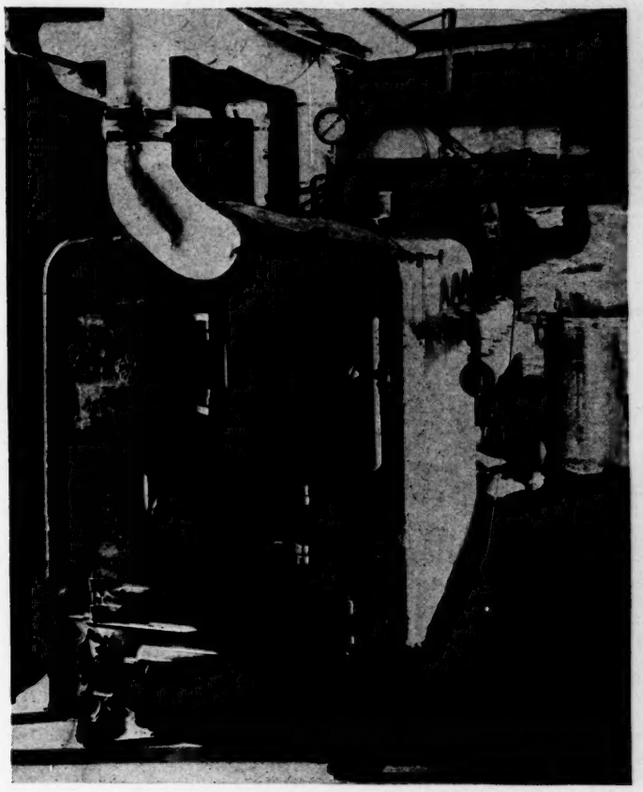
Card Files of Old Jobs Locate Modernizing Work

This large-city heating and ventilating contracting company has been fortunate during recent years in having accumulated an extensive real estate clientele. Now that the modernization movement has gotten under way and mortgage funds have been made available for property betterment, particularly in apartment houses and public buildings, considerable heating and ventilating work has been received.

It is typical of this firm, too, that its engineers have kept abreast of improved equipment. This has enriched the selling conversation of the sales force when it comes to talking with property owners. The advantages of modern equipment have been brought to the fore in such a way that, instead of merely soliciting heating and ventilating modernization as such, the representatives offer definite improvements.



Contractor carries six different makes of oil burners in order to fill any modernizing contract



Cast-iron heating boiler on modernized job in New York. Contractor finds two-pipe layouts increasing in his work

For example, copper radiators and concealed radiators have been installed much of late, as have also air conditioning, oil burner, and fire protection sprinkler systems. It is significant that a constantly greater number of installations of two-pipe layouts are being ordered, as contrasted with one-pipe plants of former years. In effect, this means growth in popularity of modulated, vacuum, vapor, and other improved systems.

Many contracts have reached this contractor of late that cover heating as replacement and extension in apartment houses. Old houses of two to four stories are now being razed and six and eight-story buildings are going up in their place. This, naturally, calls for heating, and, if there are stores or restaurants, air conditioning and ventilation. Increase in Federal and other public buildings has brought considerable new work.

Few contractors as large as this one actively push the sale of appliances. In modernization there was considered to be an active market for oil burners of many types and sizes. An expert was added to the force and the contractor now sells any one of a half-dozen makes, according to requests of customers or the requirements of conditions.

Other recent organization changes to meet the fresh demands of modernization work include the delegation of special work to separate department heads, known as experts in their line. For instance, there is an oil burner man, as already stated; an air conditioning expert; a heating expert; a ventilation specialist; a repair expert, and others. A single engineer or single depart-

ment does not handle all varieties of estimating. Each department, to the contrary, handles only the specialty accredited to it.

A spokesman for the company stated that recent improvements in equipment afford heating and ventilating contractors a far wider opportunity than was true 10 years ago. This suggests the idea that if old customers have well functioning systems in use there is still an opportunity to sell them improvements such as automatic controls, fin radiators, stokers, circulating pumps, closed hot water heating systems, motors to replace steam engines, and the like.

If this organization's experience is a criterion, the contractor is in a far better position to find work than ever before. He has more to offer clients. Money saving and relief from drudgery characterize most of the improvements and now that modernization is in the air, interest in betterments is more vital than at any previous time, states this contractor.

Form letters and other methods of advertising supplement personal contacts in locating business possibilities. Fire protection work, by way of sprinkler systems, fits admirably into modernization, particularly now that loans usually can be secured for such work. Sprinklered buildings take a lower insurance rate than unprotected structures and consequently repay their cost in a few years.

Much work comes from engineers' and architects' offices, while most of the remainder is derived from consultation of card files of old customers, the files containing several hundred such names. If boilers and piping are known to be old, say older than 15 years, it is evident that replacements may be needed. A visit to the owner is made to find out. If hot water systems have originally been installed with open expansion tanks, as shown by the cards, an effort is made to interest the owner in closed, or pressure, systems and circulating pumps.

If old-fashioned, high radiators are noted an effort is made to substitute low, long, radiators or fin-type radiation. If customers are known to be fastidious, concealed radiators are offered to replace those exposed. Thus card files of past work reveal hundreds of opportunities on modernization, according to a representative of the contractor, and these are being followed at this time with profitable results.

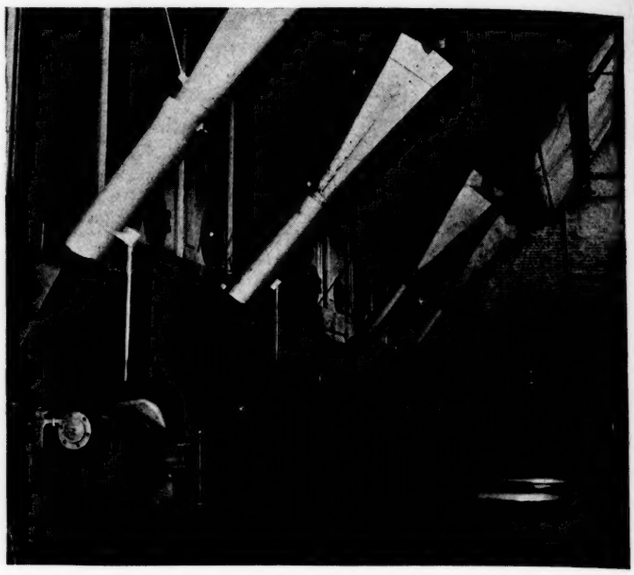
Firm—Raisler Heating Co., New York, N. Y.

●

Engineer Finds Modernizing in Air Conditioning and Zoning

Since people began to consider modernization seriously many new varieties of work have opened for a widely-known consulting engineer who has operated in a large metropolitan area for many years. Recent impetus in the improvement cycle marked the beginning of rebound from the lean years from 1931 to 1933.

The favorable turn in this engineer's affairs came about by reestablishing business ties made during the world war when he had branches in Boston, New York, Washington, Pittsburgh, and Buffalo. After closing the branches a few years ago no effort was made to keep the clients secured during the existence of such branches. Work was plentiful enough in New York without going further afield.



Modernizing large heating plants requires engineering ability backed by years of experience

Then came the crash in the big city and in the engineer's office as well. To revitalize things, letters were sent out and personal contacts were reestablished in the territories formerly served through the branches. In fine, modernization has made it desirable to increase the activity scope of solicitation for business. The card files were brushed off, scanned, and old clients gotten in touch with. What were they going to do about modernization of their old buildings and heating and ventilating equipment? Results have been surprising.

There appear to be two modernizing themes with real life in them, one is air conditioning, the other is zoning. Both kinds of projects seem to be gaining momentum daily. In air conditioning one job is found to sell another. The executive who has ridden in an air conditioned train, for example, returns to his desk and begins to investigate the possibilities in his own business. The engineers are being summoned.

Ladies who have shopped or attended a play in an air conditioned store or theater, tell their husbands about the pleasure of good air and physical comfort. They, in turn, are asking their engineers whether there are not similar advantages to accrue from air conditioning his store, factory, or other buildings. Here, it seems, is a new business wheel that actually is beginning to roll and bids fair to keep on turning for some years to come.

Fuel saving and better heating resulting from supply line zone control, appreciated by commercial management and stockholders as reflected in diminished operation cost, urge the spread of this type of work, which virtually necessitates the superior experience of engineers in ferreting out the intricacies of the modernization problems if it is to function as intended.

This consulting engineer also has found considerable work in correcting and otherwise remodeling the plans and specifications of what might be termed unqualified bidders in heating and ventilating. One instance cited

is that of a novice who has drawn plans and specifications that called for a modernization expense of heating and ventilating of $700. Revamping the specifications by the professional engineer, after the installation had failed to work well, covered a further investment of $10,000. According to the engineer, it would have been impossible for the customer to secure the results desired on a smaller appropriation.

The situation just referred to is held to be the direct result of chiseling and the present desire of building owners and operators to accept prices that are lamentably cheap, simply because of the allure of small figures. Financial institutions, insurance companies, and owners of building groups are found to be employing engineers and labor superintendents to reduce modernization costs. Some of these newly acquired men, in an effort to keep costs to a minimum and due to inexperience in engineering, are likely to draw plans and compile specifications that must be corrected by professional consulting engineers. The entree into this corrective work is believed to come from more or less constant calls on large operators.

Among the latter class of new-business prospects are banks, the larger are thought to be the better prospects because they alone seem to recognize the value of enhancing substantially real estate values for sale and rental. The smaller institutions are found to be making only a few minor repairs on foreclosed property, hoping to make these suffice until buildings can be disposed of and the maintenance expense shifted.

In obtaining engineering contracts personal visits are found as effective as letter writing, if not more so. This engineer periodically visits Boston, Buffalo, Washington, Pittsburgh, also maintaining personal contacts in his home city, New York. This necessitates much traveling but the good results secured have offset the cost and annoyance of greater traveling than during the past five years. In the event news of proposed modernization projects has not reached the engineer by word of mouth, trade journals, newspapers and business reports are constantly scanned for information on proposed work. Unless it is evident that engineers already have been employed, the owners are solicited for engineering services. Despite the smaller-than-usual per-job expenditure, the aggregate volume of business being placed due to modernization is found substantial.

Firm—Dwight D. Kimball, New York, N. Y.

●

Personal Contacts Bring Modernizing to an Engineering Firm

An old-established prominent engineering firm, organized for large projects in heating, ventilating, and air conditioning, found it advisable of late to solicit work for the first time in many years. This is done chiefly by increasing personal contacts, particularly of a social nature. Large acquaintance and popularity of the partners give them an entree to owners of large businesses.

This situation permits discussion of the benefits of air conditioning, of zoned heating, of labor and fuel saving improvements of various kinds. The ideas resulting often lie dormant for a long period in the minds of those in a position to order the betterments, but finally result in requests for plans and specifications. These have been received in gradually increasing numbers during the past year.

According to the spokesman for the firm there is considerable activity just now in connection with remodeling of hotels and restaurants to equip them for the sale and serving of alcoholic beverages. Ventilating and air cooling have been dominant objectives. Hotels and apartment houses also offer lucrative fields. Opportunities to estimate such work come direct in many cases, in others from architects' offices. "Circulate and make many personal contacts," is the slogan at this time.

A few of the projects recently handled include air conditioning for a large hotel, air cooling in a prominent men's club, heating change-overs for several manufacturing plants, apartment house heat supply zoning. The majority of cooling contracts have involved the application of steam jet refrigeration apparatus.

Modernization work also has reached the firm from financial houses that have assumed title to foreclosure property of numerous kinds including office buildings, apartment houses, manufacturing establishments. The new owners usually call in engineers in handling the larger type of building and project. Small work is frequently figured directly by heating contractors or others in the direct employ of the real estate departments of banks, insurance companies, and mortgage houses.

This has made it desirable to keep in touch with the officers of banks and mortgage companies. Although, in general, work passing through the hands of the firm has been smaller than in past years when the most time was devoted to estimating new construction, the aggregate volume of business is larger than might be supposed. The engineers find they have had to become salesmen, as well as engineers, seeking work through personal contacts, letters to old clients, and in other ways. It is held that if the engineer consents to try to sell his services and if the firm or individual is favorably known there will come plenty of opportunities to quote on modernization jobs of a profitable sort.

No particular kind of modernization work is sought although emphasis is placed on air conditioning and comfort cooling, these being held to offer wider opportunities just now than what might be called plain heating work. One reason is that only qualified organizations can estimate conditioning and cooling with any degree of accuracy and satisfaction to the owners of the property. Next in line, as to modernization opportunities, is regrouping piping lines to permit heating zoning. Public buildings, clubs, and hotels, represent the preferred building classes. There is plenty of work for engineers in these classes of structure and the surest way to be asked to estimate, draw plans and specifications for them is through personal contacts.

Firm—Tenney & Ohmes, New York.

Title II of Housing Act Launched

with mortgage rate of 5% established for new residential building. Modernizing drives accelerate. Increase in heating equipment reflected in cold statistics.

THERE were four important developments in Washington during the past month which concern the construction industry, all of them either directly or by implication encouraging. Outstanding in the news was that the provisions of Title II of the National Housing Act finally went into effect. This part of the act was planned to stimulate new building by insuring private loans and thus release a large portion of frozen capital for building residential dwellings.

Second was the announcement that Home Owners Loan Corporation will receive no further applications for aid. The encouraging feature of this move was that the government apparently is confident that the provisions of Titles II and III will so relieve the mortgage situation that direct government aid to home-owners will no longer be necessary.[1]

Third was the announcement that FHA has insured 41,275 applications for modernizing loans totalling $17,587,850 as of November 16. Fourth was the preparation for launching of a campaign by the Farm Credit Administration to modernize farm dwellings.

Title II

According to James A. Moffett,[2] Federal Housing Administrator, the following results are the objectives of Titles II[3] and III:

Establishment of a nation-wide basic interest rate of not more than 5% for first mortgages on all new home construction and of not more than 5½% for home mortgage refunding.

Elimination of the second mortgage and all other junior instruments in home financing.

Elimination of the short-term mortgage in home financing, thus doing away with the uncertainty and the expense of frequent renewals of mortgages.

Development of a system through which funds from any section of the country may be utilized in financing home construction in any other section.

Establishment of a plan by which the ownership of a home may be acquired on terms comparable to the payment of rent.

Creation of a procedure through which existing first mortgages on dwellings may be refinanced on easy terms.

Development of a universal standard of appraisals.

Establishment of a plan of mutual mortgage insurance which will place financial institutions again in a position actively to engage in real estate financing.

Organization of national mortgage associations which will furnish markets for home mortgages now frozen in banks and other financial institutions.

The placing at the disposal of investors of a real estate debenture backed by first mortgages insured under government supervision.

These sweeping reforms should result within the next few months in the development of extensive construction activities, and, over a long range, they should stabilize home construction, eliminating the hills and valleys of building booms and real estate depressions.

It will be noted that under Titles II and III, as is the case under Title I, no direct loans are made by the government. The act provides only that a home financing system be set up through which private capital and industry may function to better advantage than has been the case in the past, for the benefit of both the borrower and the lender of funds.

Up to this time financing in the United States has been very much of a patch-work proposition. There has been no uniformity of practice. Interest rates on first mortgages have varied strikingly in different sections of the country. Conditions have been such that in the case of most homeowners they have been compelled to give second and in some instances third mortgages on their properties, and the costs of this secondary financing have been high.

Under Titles II and III, not only will the interest rate be uniform but secondary financing should be eliminated, because insured first mortgages may be made on a basis as high as 80% of the appraised value of the property.

The Better Housing Campaign

The Better Housing Campaign being carried on under the provisions of Title I of the National Housing Act is of the utmost importance to the heating industry, for heating loans account for 11.34% of the loans made so far. The following table, the latest analysis,

[1] According to the latest report of HOLC, that unit has advanced somewhat less than $2 billion to save nearly 650,000 houses from foreclosure. About $1.2 billion is still available which may be used to finance 400,000 homes on a long term basis. While no new applications will be received, the remaining funds are sufficient to put through a major portion of the eligible pleas still on file.

[2] Who, if he is successful in obtaining a marked upturn in private building by Spring, may head off the rumored $7 billion public works program said to be under consideration by Secretary Ickes.

[3] On November 3, Mr. Moffett pointed with pride to the first approval of a lending institution under Title II—Guaranty Trust of New York, the world's largest institution dealing in mortgages, with resources of $1.5 billion. The first approval of a mortgage was by Riggs National Bank, Washington, with resources of $85 million.

AN OUTLINE OF TITLE II, NATIONAL HOUSING ACT

WHAT IT IS

A method whereby financial institutions can insure with the government their mortgage loans on new and certain existing buildings.

WHAT IS ITS PURPOSE

To provide a system of LONG TERM financing of residential mortgages to (1) reconstruct a large volume of existing mortgage indebtedness, (2) attract new capital to residential building, (3) having accomplished (1) and (2), assure the flow of a more constant supply of funds for residential building, (4) iron out the peaks and valleys in building construction.

WHAT IS ELIGIBLE

Urban residential dwellings for not over four families located on real estate (1) owned outright, or (2) under lease with at least 50 years to run, or (3) in leasehold with a not less than 99 year renewable lease. The building must conform with certain economic standards.

WHO IS ELIGIBLE

The borrower must show that the periodic payments bear a proper relation to his income; that he has a good credit standing, and that the building is free of other liens and mortgages.

WHAT AMOUNT CAN BE BORROWED

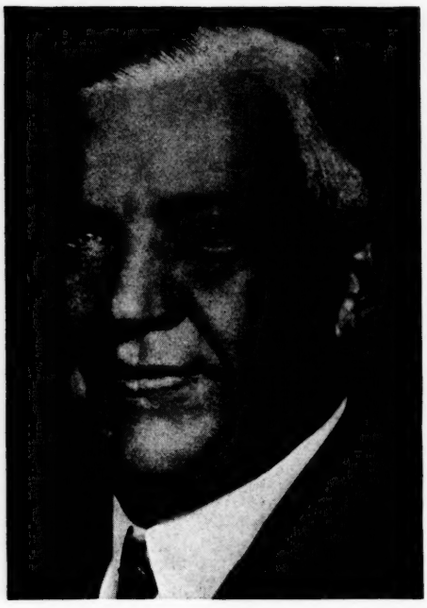
The principal and initial service fees may not exceed $16,000, and may not exceed 80% of the appraised value of the property. The maturity must not exceed 20 years.

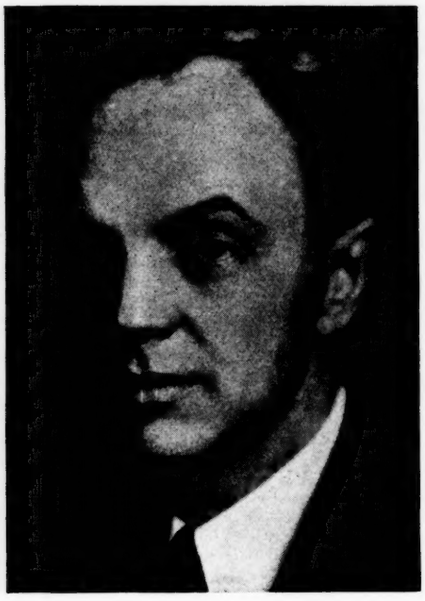
WHO MAKES THE LOANS

National, state and mutual savings banks; trust companies; life insurance companies, mutual building and loan associations.

WHAT IT COSTS

Mortgage Indebtedness Arising From	Interest Rate Exclusive of Premium Charge, per Year, Not to Exceed	Service Charge, per Year	Mortgage Insurance Premium, per Year	Payment on Principal, per Year, per $1000	Total Payment per Year per $1000
Financing (without change in lender) of Bona Fide Sale or Resale of Property Existing on June 27, 1934.	5%	None	½ of 1%	$30	$85
Loan to Borrower for Financing Acquisition by him of Property Constructed After June 27, 1934.	5%	½ of 1%	½ of 1%	$30	$90
Refunding of Present Indebtedness (without change of borrower or lender) on Property Existing on June 27, 1934.	5½%	None	1%	$30	$95
Refunding of Present Indebtedness (with change of lender) on Property Existing on June 27, 1934.	5½%	½ of 1%	1%	$30	$100





(Left) FHA's Deputy Administrator J. H. Ardrey heads Title II. He was formerly executive vice-president of Guaranty Trust Co., New York. (Right) Miles L. Colean, a former Chicago architect, is in charge of the development of housing standards for FHA. Photos by Harris & Ewing.

shows the distribution of these loans as of November 1. (The analysis is of a large number of *typical* loans):

	Number	Per Cent
Redecorating (interior)	1,527	14.18
Heating	1,221	11.34
Painting outside	1,182	10.97
Roofing	1,098	10.20
Plumbing	1,074	9.97
Exterior repairs	1,036	9.62
Remodeling—general	857	7.96
Interior repairs	835	7.75
Additional rooms	570	5.29
Cementing	473	4.39
Remodeling—bathroom	336	3.12
Lighting	314	2.92
Remodeling kitchen	202	1.88
Miscellaneous	26	.24
Garage	18	.17
	10,769	100.00

On November 16 there were 3904 community campaigns already organized or in the process of organization. Permits for additions, repairs, and alterations (as reported by the Bureau of Labor Statistics of the U. S. Department of Labor) showed a gain of 42% in dollar volume for October as compared with October, 1933.[4]

New York City led in the volume of this work. the total being $6.2 million, as compared with $3 million last year, a gain of 104%. Los Angeles modernizing activities increased 132%.

Many of the manufacturers in the heating and ventilating industry are profiting from the increase in modernizing work, as are dealers and contractors. In a town of 1000 people in South Dakota, six automatic stokers were sold in one day, all of which were financed under the Federal Housing plan. In 10 days' time the salesman has sold a total of 53 automatic stokers in South Dakota, all of which were financed by the same plan.[5]

Encouraging news is found in most sections of the country. Examples:

Some of last month's most striking gains in additions, alterations and repairs were made by the following cities:

City	October, 1934	October, 1933
Cleveland, Ohio	$330,200	$84,635
Jacksonville, Fla.	102,708	45,000
Battle Creek, Mich.	176,712	2,200
Tucson, Ariz.	37,966	17,242
Salem, Ore.	23,028	10,164
Evansville, Ind.	110,010	20,598
Cedar Rapids, Ia.	74,523	20,188
New Haven, Conn.	34,430	9,230
Savannah, Ga.	39,633	3,586
Portland, Me.	27,260	6,930
Wichita, Kan.	20,051	11,415
St. Louis, Mo.	138,693	66,318
Houston, Tex.	123,780	19,480
Jackson, Miss.	129,316	12,345

There has been $11 million in home repairs in eastern Pennsylvania. In Nassau County, N. Y., financial institutions have made loans totaling approximately $348,086. In Detroit, at least $1 million worth of modernization work has been started on homes and small business properties. More than $700,000 worth of modernization work is being done in Cincinnati. Cleveland is coming strong with a half million in repair work under way.

Oklahoma City has done over $146,000 worth of repair work and improvements since August 1. Minnesota is spending $3 million as a result of the Better Housing Program. New Jersey is forging ahead, with $2 million in repair work and modernization.

In California the campaigners have been particularly active and successful. There is $11.5 million in repair and modernization work either under way or about to begin. More than $15 million worth of modernization work has been pledged in northern California alone.

Farm Dwelling Modernizing

While FHA is briskly carrying on its campaign for modernization of urban homes, the Farm Credit Administration is launching a program for the repair, alteration, and improvement of farm dwellings.

Rules and regulations have already been perfected, under which more than 600 farm production credit associations will be able to make loans for this purpose

[4]The total of permits reported was $10.5 million for October, 1934, and $7.4 million for October, 1933. It is to be noted, however, that this is only an indication and not a total of all modernizing and repair work. It covers only those cities which report to the Bureau. Among these cities the local ordinances differ widely as to what work requires a permit and what does not. FHAdministrator Moffett estimates that the previously referred to $17.6 million loans insured by FHA is only a fifth of what is actually being spent or is planned to be spent for modernizing.

[5]The increased business done by companies in the building field resulted in a spurt in the number of their shares sold on the stock Exchange. American Radiator Company shares led all others in volume during a day in the second week of November, and were in the first five several other days.

(Concluded on page 70)

Industrial Firms and Equipment Manufacturers Protest Heating Contractors Code,

want right to install, service their own plants. Dealers make same demand.

THE NRA Code for the Heating, Piping & Air Conditioning Contractors Industry is a broad one. When Article I relating to definitions was written, little was overlooked in the way of equipment installation which would come under the contractors code. These definitions included the furnishing and installing of systems or parts for much more than ordinary steam and hot water heating, ventilating, and air conditioning systems. The code also covers refrigeration, power piping, industrial process piping, sprinkler piping, temperature control piping, high pressure boilers, and oil burner systems.

It was to be expected that the latitude embraced by this code would result in protests from various groups. These protests were not long in coming, and a hearing was finally held in Washington on November 8 with Major R. M. Campbell, deputy administrator, presiding.

Two major points were under consideration. First were the definitions of what heating contracting includes, while the second covered the amount of overhead to be added to material and labor costs, specified in the code as 12½%.

Protests presented at the hearing were numerous, but practically all were of three general classes having more or less in common in opposing the code. These were (1) industrial firms, some of whom wish to do their own process and other piping; (2) manufacturers of heating and air conditioning equipment, some of whom do their own installing. This group includes manufacturers of power boilers who also do their own installing; (3) dealers handling stokers and oil burners who feel that these are specialty lines and should not come under a contractor code.

Industrial Companies: The attorney for Baldwin Locomotive Works and its subsidiaries claimed that all operations covered by the Heating, Piping & Air Conditioning Contractors Industry Code are already covered by other codes and that the sponsors of this code represent only the contracting element of the industry and not the manufacturers, and indicated that if relief were not obtained this company would take the matter before the Courts.

J. W. O'Leary, representing the Code Authority of the Machinery and Allied Products Industry, endorsed the previous statement and contended that his code already covered this matter. He suggested that the words "for compensation or hire" be inserted in the definitions at several points, which would have the effect of excluding manufacturers who were doing work of this character as a part of their installation or maintenance when installing or servicing their own products.

Major Campbell inquired whether the manufacturers had actual experience that would indicate that the HPACC code had worked a hardship on them. The reply was that they had no such actual experience but felt that such would be the case.

A representative of the Locomotive Manufacturers Division of the Machinery and Allied Products Industry approved the statement made by the previous speaker.

Although not falling strictly in this industry group another protest was made for similar reasons—the alleged right for owners of property to do work on their own property. This protest was from H. J. Gary, representing the National Association of Building Owners and Managers.

Manufacturers: S. B. MacNaught, general counsel for the Refrigerating Machinery Industry and for the Air Conditioning Manufacturers Association, approved the previous statement, asked for modifications of definitions so that the manufacturer, owner, or tenant can perform these operations on his own premises, provided such operations were not done for hire or profit. He claimed that the sponsors of the code were not truly representative of the industry. Mr. MacNaught suggested that the whole matter be reopened so that all elements of the industry would be represented.

W. B. Henderson, representing the Refrigerating Machinery Industry, also approved the points made by the previous speakers and filed protests in written form from refrigerating machinery manufacturers.[1]

Many high-pressure boilers are installed by their manufacturers. Consequently, J. G. Andrew, representing the Code Authority of the Boiler Manufacturing Industry,[2] protested. Mr. Andrew claimed that less than 10% of his industry's products were sold for installation by other than manufacturers. He requested exclusion of his industry from operations under the HPACC code, thus giving these manufacturers the right to install and service their own products, and install and service such products on their own premises.

Haldeman Finnie, representing the National Electrical Manufacturers Association, requested changes in definitions to exclude his industry since it had no part in making the code. A representative of the Code Authority for the Scientific Apparatus Industry claimed that the HPACC Industry's code had treated them unfairly and requested that the definitions be modified so that his industry could be excluded.

Briefs along the same lines as the above were filed by representatives of the Automobile Manufacturers Association, Lumber Code Authority, and American Iron & Steel Institute. A protest was also filed by the Power Piping Association.

Dealers: A. W. Clark, representing the Oil Burner Code Authority, Distillate Burner Manufacturers Association, and the newly-formed National Oil Burner Dealers Association, claimed that his industries could not afford to operate under the HPACC code, as this would raise their labor costs 25%.

John J. Beatty, representing stoker dealers and the Iron Fireman Manufacturing Company, asked elimination of the word "stokers" from the definitions, and claimed that the sponsors of the HPACC code did not represent them, nor did they have representation.

The New Jersey State Association of Master Plumbers through its representative, A. F. Ruehl, protested the code on the grounds that it was not representative of the whole industry and particularly not representative of those who perform heating work in dwellings, but rather that it was representative of the larger contractors. He claimed that the HPACC code usurped certain functions of the plumbing contractors code.

---

[1] Including: York Ice Machinery Manufacturing Co.; Carrier Corp.; Midwest Engineering and Equipment Co.; Carbondale Machine Co.; General Refrigerating and Sales Co.; Frick Co.; Howe Ice Machine Co.; Baker Ice Machine Co.; Phoenix Ice Machine Co.; Wittenmeier Machine Co.; Campbell Co.; and Creamery Packing and Manufacturing Company.

[2] Not to be confused with the Steel Heating Boiler, or Cast Iron Boiler and Radiator Industry. The Boiler Manufacturing Industry consists of makers of high-pressure boilers.

Defense for the Code

Support of code definitions was given by officers of the Heating, Piping and Air Conditioning Contractors Code Authority and by S. F. Voorhees, chairman of the Construction Code Authority. Among the former who spoke were Robert D. Williams, chairman, Heating, Piping and Air Conditioning Contractors Code Authority; J. Lawrence DeNeille, vice-chairman of the authority and president of Heating, Piping and Air Conditioning Contractors Association; John H. Zink, vice-president, H.P.A.C.C.N.A.; Thomas O'Callahan, director, and M. J. Chagnard, of the same organization.

The supporters of the code as it stands defended the code and summarized their claims as follows:

1. The definitions describe only work that the contractors do, and have done, for many years.
2. The Construction Code was approved before the Machinery and Allied Products code, and that if any changes are made they should be made in the later code.
3. Manufacturers would have an unfair advantage in competing conditions if not bound by HPACC code provisions.
4. Manufacturers sell products to contractors but wish to compete with contractors on a privileged basis.
5. There is no objection to manufacturers doing work in this field, but they should be required to work under the same provisions as contractors for like work.
6. The manufacturer's function should end when the equipment is shipped.
7. Out of 128 concerns asking exemption, 78 petitions were identical in form except for signatures, thus suggesting concerted action to avoid code.
8. No objection was made to the code by manufacturers until the code was amended to cover wages for skilled mechanics. Then the manufacturers objected.
9. The main issue is whether or not manufacturers shall pay same wage scales as contractors.
10. Manufacturers and contractors should be bound by the same rules when doing similar work.

A defense of the code was also presented by John Coefield, international vice-president of the plumbers and steamfitters union.

A number of letters were also placed on the records. These letters requested that the definitions not be changed.

Overhead

In regard to the 12½% overhead clause the principal discussion centered on whether this allowance was high enough. The HPACC Code Authority recommended that this rate be increased, and based their argument on a survey made by a certified accountant in New York. This survey, covering a large number of concerns whose business was classified as to dollar volume into five classifications ranging from about $32,000 per annum up to $250,000 per annum, showed that the average overhead item was slightly in excess of 24%.

Major Campbell filed 97 letters received by his office. Fifty of these advocated that no change be made, 47 recommended an increase.

Durable Goods Men Meet

The longer NRA continues to operate, the need for standardization of definitions becomes more apparent. What do such terms as "wholesaler," "jobber," "retailer," "contractor," and "consumer" mean, for example? The correlation of codes, as previously noted here, has also become a necessary activity.

To discuss such subjects as these, representatives of 23 durable goods industries representing an invested capital of $2.7 billion and employing over 700,000 workers met in Washington November 2. Deputy Administrator Beverly S. King presided, and Divisional Administrator Barton Murray and Assistant Administrating Officer George S. Brady spoke.[3]

The Code Authority membership of the Boiler Manufacturing Industry was recognized November 10.[4] It consists of: Starr H. Barnum, The Bigelow Company; Owsley Brown, Springfield Boiler Co.; M. E. Finek, Murray Iron Works; E. C. Hutchinson, Edge Moor Iron Co.; W. F. Keenan, Jr., Foster Wheeler Corp.; H. B. Kendall, W. N. Kellogg Co.; R. B. Milden, Westinghouse Electric and Mfg. Co.; A. G. Pratt, The Babcock & Wilcox Co.; A. W. Strong, Strong-Scott Mfg. Co., and A. C. Weigel, Combustion Engineering Company.

[3]Among those in attendance were: Lewis Moore, Jr., chairman, Code Authority, Cooking and Heating Appliance Industry; John A. Fry, chairman, Code Authority, Gas Appliances Industry; George E. Bean, Washington representative, Gas Appliances Code Authority; T. M. Bohen, chairman, Code Authority, Non-Ferrous Hot Water Tank Industry; A. J. Fleischmann. chairman, Code Authority, Oil Burner Industry; Harry Tapp, secretary, Code Authority, Oil Burner Industry; L. B. Lent, secretary, Code Authority Scientific Apparatus Industry; E. K. Lanning, chairman, Code Authority, Steam Heating Equipment Industry; B. W. Jennings, secretary, Code Authority, Steam Heating Equipment Industry; H. T. Richardson, chairman, Code Authority, Warm Air Furnace Manufacturing Industry; A. W. Wrieden, secretary, Code Authority, Warm Air Furnace Manufacturing Industry; W. K. Simpson, chairman, Air Valve Industry; Chas. M. Tull, chairman, Steel Tubular and Firebox Boiler Industry; R. A. Locke, secretary, Code Authority, Steel Tubular and Firebox Boiler Industry; R. E. Frederick, member, Code Authority, Commercial Refrigerator Industry; Claude Owen, member, Code Authority, Wholesalers Plumbing and Heating Supplies; Lester Williams, chairman, Code Authority, Pipe Nipple Industry; William J. Walther, secretary, Code Authority, Pipe Nipple Manufacturing Industry; Edwin W. Smith, chairman, Code Authority, Cast Iron Boiler and Radiator Industry; Wm. H. Price, Jr., representing Code Authority for Unit Heater and Unit Ventilator Industry; J. I. Lyle, chairman, Code Authority for Unit Heater and Unit Ventilator Industry; J. I. Lyle, chairson, secretary, Code Authority, Refrigerating Machinery Industry; R. W. Blanchard, chairman, Code Authority, Warm Air Register Industry, and Perry Dawson, secretary, Water Heater Manufacturing Industry.

Other Industries

Machinery and Allied Products Industry: Employes of the industry were made certain of eating their Christmas dinner at home by an amendment approved October 23 which clarified Article 3, Section 3 of its industry's code by specifying which days are legal holidays. They are: New Year's Day, Christmas Day, Memorial Day, July 4th, Labor Day and Thanksgiving.

Refrigeration Valves: The code for the refrigeration valves and fittings industry was approved recently, effective September 16. This code is a supplement to the basic code for the fabricated metal products manufacturing and metal finishing and metal coating industry.

Adopting the wage and hour provisions of the basic code, the industry will pay minimum hourly rates of 40 cents for male and 35 cents for female help in the north, and 35 cents for male and 30 cents for female help in the south. If the minimum hourly rate as of July 15, 1929, was less than these figures, the rate then in force will prevail, but will not be less than 32½ cents in the north and 30 cents in the south. The maximum work week will be 40 hours.

Sponsored by the Refrigeration Valves and Fittings Manufacturing Association, the code provides for a Code Authority of five members, one to be elected by all members of the industry, one by all members of the industry not members of the association, and three by a weighted vote of the members of the association.

Cast-Iron Soil Pipe: This industry's code authority was appointed during October. Members are: W. J. Kirby, Somerville, N. J.; George A. Harder, New York; William A. Brecht, Philadelphia; C. A. Hamilton, Anniston, Ala.; William H. Deyo, Anniston, Ala.; James R. Hedges, Chattanooga, Tenn., and Joe H. Gardner, Buffalo, N.Y.

[4]Approved the same day was the Code Authority Membership for the Mechanical Packing Industry. The members are: George L. Abbot, The Garlock Packing Co.; Frank J. Wakem, Packing and Power Specialties Division, Johns-Manville Corp.; H. S. FitzGibbon, FitzGibbon & Co., Inc.; A. W. Smartz, Linear Packing & Rubber Co., Inc.; Non-association member: B. Franklin Connor, Colt's Patent Fire Arms Mfg. Company.

Night Schools, Home Study, and College Courses Offer Instruction in Heating, Ventilating, and Air Conditioning

OVER a century and a quarter ago Benjamin Franklin bequeathed to his native town of Boston the sum of one thousand pounds sterling (about $5000) which was to be loaned at 5% to aid "young married artificers" in starting business. At the end of one hundred years it was to be divided, a part continuing at interest for another century and another part to be expended for such public works as were judged to be of most general utility to Boston.

The bequest was in litigation in 1891 when the first part of it was available, and the Supreme Court decreed that a Board of Managers should have charge of the fund, to expend according to their best judgment. An industrial school and technical institute was deemed to be of the most general utility to the inhabitants of Boston, and so Franklin Union was started with erection of the present handsome building.

Since the Union was opened in 1908, over 30,000 men and women have been enrolled as students. This year Franklin Union has about 60 students in its heating and ventilating course, held three evenings a week from October 1 to March 15. It is conducted by Norman Shaw of the staff of Barnes & Jones, Inc., is intended primarily for steamfitters and draftsmen, and instruction includes drawing, plan reading, principles of heating, and the design of small direct hot water, steam, and vapor systems.

Adolph Ehrenzeller, of the Walker & Pratt Manufacturing Company, is director of the second-year course, also held three evenings a week for the same period. This course includes the design of warm-air furnace systems of heating, with and without fans, and gravity indirect vapor-vacuum heating and ventilating systems.

P. A. L. Foulds, of the staff of Hollis & French Associates, consulting engineers, has charge of the third-year course, which covers advanced design of a fan system of heating and ventilation, as applied to hospitals and office buildings; vacuum steam heating systems, and to exhaust steam heating and ventilating systems for an office building. On completion of the third-year course, a certificate is granted.

Average age of the students is about 26 years. Many of these have their own businesses, while others are workers in the heating and ventilating fields, with a small sprinkling of college graduates, and some salesmen in the field.

Registration fees are very low, those for the heating and ventilating courses ranging from $20 for the first year to $30 each for the third and fourth-year courses, or about a dollar an evening for the first year and less than two dollars per evening for the two advanced years.

Franklin Union, Boston

Only a few years ago there were few courses in heating and ventilating outside of engineering colleges, a number of which had optional courses in heating and ventilating for senior mechanical engineering. This is no longer true. Interest in heating and ventilating has grown, and the tremendous popularity of air conditioning has resulted in what is an astonishing number of day, evening, and correspondence courses in heating, ventilating, and air conditioning.

The New York Y.M.C.A. schools recently announced a 20-weeks' evening course on Tuesdays and Thursdays in air conditioning. The instructor is William Hull Stangle.[1] The tuition fee, which is $50, can be paid in installments. Included in the course in addition to the fundamentals of heating and ventilation are lectures on city ordinances, painting, laundry equipment, and other mechanical equipment of buildings. The subject matter has been arranged in a series comprising lectures, examples, problems, demonstrations, and examinations.

A course on air conditioning, for factories, theaters, and other buildings, was started November 13 at the Massachusetts Institute of Technology, conducted by Prof. Raymond U. Fitz of Tufts College. The class meets Tuesday evenings and the entire course includes 16 lectures of two semester hours each. The fees for this are divided into two parts of eight lectures, at $5 for each part for auditors and $6 to credit students. This course, also offered by correspondence, includes the fundamentals of air conditioning, together with illustrative examples covering a wide range of applications. The correspondence course is an activity of University Extension, Massachusetts Department of Education, Boston.

A correspondence course in heating and ventilating engineering is available from the University Extension Division of the University of Wisconsin, Madison, Wis. This consists of 24 assignments, with a fee of $24 for non-residents of the state and $15 for residents.

Pratt Institute of Brooklyn is offering two evening courses on Mondays, Tuesdays, and Thursdays, 12 weeks each, the one a course in fundamentals, the second a course in design, with a fee of $10 and $20, respectively. The instructor is J. W. Hunter.

The Polytechnic Institute of Brooklyn offers an evening course consisting of 30 1½-hr. sessions meeting Wednesday and Friday evenings. The tuition is $35 and John Everetts, Jr., is the instructor.

A number of courses have been offered in the past, and probably will be in the future, by manufacturers for their dealers, contractors, jobbers, and others. Among these are Fox Furnace Company, in a course which was devoted primarily to warm-air furnace conditioning. The Lakeside Co., Hermansville, Mich., last winter inaugurated the Furblo Institute of Mechanical Heating and Air Conditioning for its heating contractors. Frigidaire last winter held a course in air conditioning for its dealers, distributors, utility men, and associated manufacturers.

The Drexel Evening Diploma School in Philadelphia started a course in air conditioning on September 24 for college graduates only, with a smaller course for less advanced students. On the West coast the Oregon Institute of Technology recently opened an evening course at the Portland Y.M.C.A., with H. S. Bastian as instructor.

The Heating, Piping and Air Conditioning Contractors National Association has published a series of 10 lessons on air conditioning for home study (not a correspondence course)

[1] Who will be remembered as co-author of a course in "air conditioning" which appeared in HEATING AND VENTILATING several years ago.

which is available for $5. The Denver local group of this association is holding a class for its members and their men on air conditioning, the class meeting in the evenings. The New York City branch is cooperating with the Board of Education of the City of New York and the Building Educational Trades Committee in backing a course being held at a New York school.

An evening course in air conditioning was held at Fenn College, Cleveland, last winter for two hours each Thursday and extending to two semesters of five months each. W. J. Ottinger was in charge of the course. The tuition for each was $21 per semester. No information is available as to whether this is being held this year.

Rutgers University, New Brunswick, N. J., through its extension division, is offering a course in air conditioning which began about three years ago, and has had considerable success.

The School of Engineering at Milwaukee, Wis., is reported as having a 10-weeks' course, three nights a week.

Two colleges have held conferences extending over a number of days on the subject of air conditioning in the past, and probably will in the future. Michigan State College, East Lansing, holds an annual short course in forced warm-air heating late in March, while Case School of Applied Science, Cleveland, has had lecture courses in air conditioning.

Last winter the Western Society of Engineers, cooperating with the Chicago section of the American Institute of Electrical Engineers, held a lecture and laboratory demonstration course. The fee was $5.

The David Ranken, Jr., School of Mechanical Trades in St. Louis held an evening course last winter in air conditioning for engineers, architects, mechanics, and salesmen.

In New York, New York University has a two-year evening course in heating and ventilating engineering in which a certificate is granted. The course covers four semesters with $100 fees for each semester for the first year and $80 for each semester of the second. This course includes heating and ventilating design, application, estimating, specifications, etc.

Mechanics Institute, 18 West 44th St., New York, also holds evening courses in heating and ventilating.

In Chicago, air conditioning is now being taught in the Lane Technical High School at Western Avenue & Addison Street. Lewis Institute at 1951 West Madison St., Chicago, also offers a course in air conditioning and refrigeration. Other schools in Chicago having courses in this subject are Armour Institute of Technology, the Chicago Technical College, and Greer College. A correspondence course is offered by the American School. The Chicago Chapter of Air Conditioning Engineers, 121 North Clark Street, is conducting a course in air conditioning and a similar course can also be secured from the Air Conditioning Engineers in Chicago. I.C.S. also is reported as having a course in heating and ventilating.

Air Conditioners Require Winter Care

THERE are a number of precautions which should be taken in preparing an air conditioning system for the inactive winter season, according to L. G. Huggins, technical supervisor of Westinghouse air conditioning dealers. The most important of these are:

Store Refrigerant—The refrigerant should be removed from the system and stored in the liquid receiver of the condensing unit, to avoid loss due to leaks occurring in the winter. With a compressor standing idle for a long period of time, the oil on the face of the seal may be dissolved by the refrigerant, leaving this seal face dry and the possibility of refrigerant escaping at this point is greatly increased. If a machine is in frequent use, this is not a problem, but if it is to stand idle for months, as it probably will this winter, the customer may find he has to buy a new charge of refrigerant next spring unless this precaution has been taken. This new charge of refrigerant will greatly exceed the cost of having a dealer service the machine this fall and next spring.

Drain Water—All water should be removed from the condenser, and in the case of a water-cooled compressor, from all cooling jackets. Many condensing units are built with spiral coils so arranged that water will not drain from them completely by gravity. Therefore, the safe procedure is to blow all water out of the cooling coils by means of compressed air. A small tank of compressed air is usually carried to the job by the service man for this purpose.

Many condensing units have automatic water regulating valves which are normally closed when the condensing unit is not in operation. It is usually possible to remove the valve seat from these valves so that water can be readily blown out. Unless this valve is opened, it will not be possible to completely remove water from the system.

Disconnect Water Supply—The safest procedure after water has been removed from the condenser is to disconnect the water pipe leading to the condensing unit and cap this pipe. Usually a union will be found near the machine which will make it easy to remove this water connection. This precaution will prevent any possibility of some unauthorized person tampering with the water valve during the winter and accidentally admitting water to the condenser.

Remove Fuses—The electric power and control circuits to the condensing unit should be opened to prevent accidentally starting the unit during the winter. This can usually be accomplished effectively by removing the fuse from the safety switch and tagging the safety switch, calling attention to the fact that the circuits are disconnected and should remain disconnected until desired to again start the apparatus. In clearing the electrical circuits to the unit, the service man should make sure that he does not also interrupt the power circuit to the fans in the air conditioning unit or the control circuits for the humidifier or heating equipment if the air conditioning unit is to be used for winter operation.

Wipe With Oil—All unpainted iron or steel surfaces of the condensing unit, such as couplings, shafts, and other bright parts, should be wiped with an oily cloth to provide a thin film of protecting oil to prevent rusting during the winter.

Cover Unit—A cover of heavy paper, muslin, or similar material should be placed over the condensing unit and securely tied into place. This cover will keep the unit clean and free from dust or dirt.

Tag It—A tag should be tied to the condensing unit, telling the owner that this unit has been shut down for the winter. The tag should show the firm name, address, and telephone number, to facilitate calling a service man to put this unit back in service and properly adjust it for the cooling season next year. The tag should also caution the owner against trying to operate this unit until it is again properly placed in service by a competent service man.

If air conditioning owners and dealers will follow these suggestions, it will greatly increse the chance of enjoying trouble-free performance from this air conditioning apparatus.

A $2000 Subsistence homestead at Crossville, Tenn., built of crab orchard stone, quarried on the site, and having hand-hewn timbers

Subsistence Homesteads: A Government Activity

in residential building. What they are, where they are, how they are built, how they are heated

EVERY contractor and every manufacturer is more or less acquainted with the kind of public building and the volume of public building that the Federal and State governments have backed for the past few years. Most of these are monumental buildings or institutions or schools, with which most of us are familiar. More recently, however, another type of government-financed building has been mentioned frequently in the press—subsistence homesteads.

What are Subsistence Homesteads? Who will own them? Who builds them? Where are they located? After finding the answers to these questions most of us will then want to know the answer to How are they heated? It is the purpose of this article to answer these questions as far as possible and to look into the subject from the standpoint of possible business for the industry.

What They Are

Subsistence homesteads for the most part consist of small plots of land on which people employed in industries, trades, or other occupations[1] may own their homes and raise a portion of their food supply to supplement their cash income. Home food production enables the homesteader to achieve a more satisfactory standard of living on a part time income than would otherwise be possible, as well as afford him a means of self-support in times of retarded industrial activity.

In backing this idea,[2] the government had in mind a number of different groups who need such aid. Among these are:

"Stranded" industrial population groups. Particularly in the extractive industries, thousands of people have been left without an adequate source of employment and future livelihood because of the decline of a particular industry or its relocation elsewhere.[3] It has

Note—The editors acknowledge the kind assistance of Subsistence Homesteads Division Director C. E. Pynchon and members of his staff, including Messrs. Herrick, Murphy, Rolston, Brandt, Estey, and MacGregor, in supplying information on which this article is based.

[1]Particularly those employed for less than full time.

[2]These homesteads are financed by a $25 million revolving loan fund provided for this purpose. The Subsistence Homesteads Division of the Department of Interior is in charge of the projects.

[3]A map, to show in graphic form industrial trends in this country, to be used as a basic chart for the establishment of subsistence homesteads, is being developed by Dr. W. E. Zeuch, of the Subsistence Homesteads Division. Through use of the map and the information being gathered for its preparation, it is expected that it will be possible to locate homestead communities accurately in relation, not only to the present industrial areas, but—in keeping with the purpose of the subsistence homestead program to assist the decentralization of industry—in relation to the areas affected by industrial migrations.

been estimated that there are at least 200,000 bituminous coal miners, for example, who have little or no prospect of future employment, partly because of improved mining machinery and methods, largely because of exhaustion or closing of particular mines.

"Over-aged" workers. There are a large and increasing number of urban workers eliminated from their regular employments because of age. Bituminous coal miners, for example, are said to find employment in the mines progressively more difficult to obtain, as a general rule, as they pass beyond 35 years of age, and very nearly impossible after 45. Increasingly, apparently, certain types of manufacturing plants and some commercial institutions are drawing the employment "deadline" at from 45 to 50 years of age. A subsistence homestead, combined with wage employment, should enable these workers to become self-sustaining.

Younger workers. A garden home, acquired during his active years in industry, offers the prospect of a place to which to retire when the period of maximum earning power has passed.

There are several forces believed to be acting to make the idea of subsistence homesteads necessary. These include:

The shorter work day and work week. That technical progress, present and prospective, will result in further shortening of the work day and work week as a permanent feature of the industrial order is a view held by many. Such a trend suggests the possibility of a considerable development of garden homes within commuting distance of office and factory, both for residential purposes and as a means by which this additional spare time of the workers, together with the help of other members of their families, may be utilized in the raising of garden vegetables, fruit and poultry for family use, as a supplement to the incomes received from employment in factory, office, or the trades.

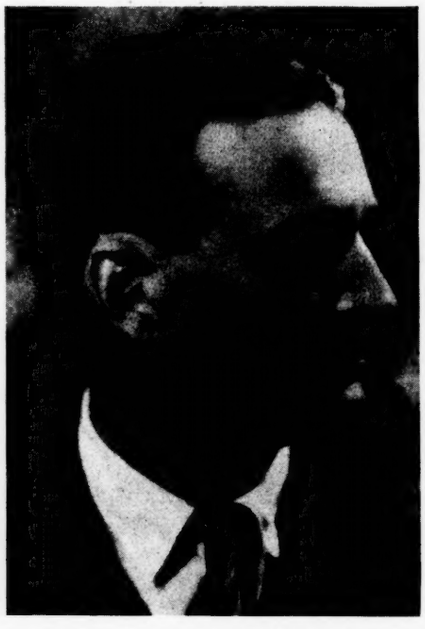
Cyclical unemployment. One approach to the problem of recurrent industrial booms and depressions is to attempt control of the business and financial system. Effective control of the business cycle, however, does not yet appear to have been developed. Another approach is an attempt to adjust to the system as it is. The development of garden homes in the vicinity of industrial centers is one way of adjusting to the system.

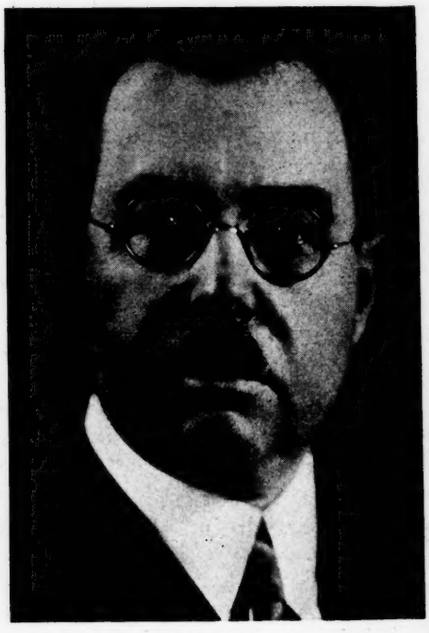
Seasonal industry. Reduced wage incomes have accentuated the difficulties of workers employed in seasonal industries. Even with wage incomes considerably increased by industrial recovery, returns in certain seasonal industries may be insufficient for a satisfactory standard of living. Where serious conflict in the seasonal demands of agriculture and the industry does not exist, or can be adjusted by a change in factory schedules, subsistence homesteads located near the plant are suggested as a desirable permanent arrangement.

Decentralization of industry. In recent years there has been a considerable movement of certain types of industry from their former centers of location. For this various causes have been assigned and the extent of the shift and reasons therefor vary from industry to industry and section to section of the country. As to location, decentralization may involve the establishment of industry on the periphery of existing industrial centers or districts, or in smaller cities or villages but still within the same general industrial region, or in either large or small centers in a different industrial region.

Who Builds Them

The Division of Subsistence Homesteads has organ-





(Left) Charles E. Pynchon, general manager of the Federal Subsistence Homesteads Corporation. He is an engineer, formerly with Joseph T. Ryerson & Son, Chicago steel concern. (Center) Brown Rolston, chief architect of the corporation, formerly partner in architectural office of Simpson and Rolston, Inc. (Right) Louis Brandt, housing engineer and materials advisor of the corporation, who has supervised construction of nearly 40,000 housing units, including housing projects for the Consolidation Coal Company. Author of "Brandt's Dwelling House Estimator" and "Forms, Methods, and Data for Home Building"

APPROVED SUBSISTENCE HOMESTEAD PROJECTS;

Their Status and Data on Heating as of November 13, 1934

State	No.	Project	Address	Manager	Disbursing Agent	Status	Heating
ALABAMA	1.	Birmingham Homesteads	415 Federal Bldg., Birmingham, Ala.	J. L. Liles (Ass't.)	Susie V. Watwood	Contract let	None
ALABAMA	34.	Jasper Homesteads	226 Phillips and Stanley Bldg., Jasper, Ala.	J. W. Phillips	Paul D. Drewry	Contract let	None
ARIZONA	9.	Rural Homes in Arizona	323 Title & Trust Bldg.. Phoenix, Ariz.	P. V. Fuller (Acting)	F. L. Montgomery	Not started	—
CALIFORNIA	37.	Rurban Homes	Route No. 2, Oak St., El Monte, Cal.	R. H. Gast	C. E. Demorest	Not started	—
DELAWARE	18.	Delaware Homestead Community	344 Delaware Tr. Bldg., Wilmington, Del.	C. E. Zollars (Acting)		Not started	—
GEORGIA	2.	Chancellorsville Community	Monticello, Ga.	J. L. Bankhead (Acting)	H. F. Eichhon	Not started	—
ILLINOIS	20.	Southern Illinois Homesteads	326 E. Main St., West Frankfort, Ill.		Paul F. Travelstead	Not started	—
ILLINOIS	49.	Lake County Homesteads	City Hall, Libertyville, Ill.	G. F. Gonsalves		Not started	—
INDIANA	4.	Decatur Homesteads	Decatur, Ind.	A. A. Watrous		Contract let for 48 houses, $125,000	Gravity warm air
IOWA	39.	Granger Homesteads	Post Office, Granger, Iowa	L. J. Schoenlein			Tenants will install own heat—stoves
LOUISIANA	57.	Morehouse County Homesteads	Bastrop, La.			Not started	
MINNESOTA	15.	Duluth Subsistence Homesteads	409 Federal Bldg., Duluth, Minn.	H. E. Farnam	John P. Twohy	Not started	Contemp. plans call for stoves
MINNESOTA	16.	Austin Homesteads	Post Office, Austin, Minn.	W. R. Plum	J. N. Kegley	Not started	
MISSISSIPPI	27.	McComb Homesteads of Miss.	McComb, Miss.	J. O. Emmerich	A. T. McCurdie	$80,000 were allocated for 25 houses	No heat
MISSISSIPPI	28.	Laurel Homesteads of Miss.	Laurel, Miss.	J. S. Grant		$80,000 were allocated for 25 houses	No heat
MISSISSIPPI	29.	Tupelo Homesteads of Miss.	Tupelo, Miss.	J. B. Lawson	C. E. Parker		No heat
MISSISSIPPI	30.	Richton Homesteads of Miss.	Richton, Miss.	O. Z. Smith	A. D. Morris		No heat
MISSISSIPPI	31.	Meridian Homesteads of Miss.	Meridian, Miss.	Mrs. C. L. Grey	J. E. May	$80,000 were allocated for 25 houses	No heat
MISSISSIPPI	33.	Hattiesburg Homesteads of Miss.	Hattiesburg, Miss.	C. W. Wood	A. T. McCurdie	$80,000 were allocated for 25 houses	No heat
NEW JERSEY	8.	Jersey Homesteads	Box M, Hightstown, N. J.	Max Blitzer	Mac Adlerman	Not started	
NEW YORK	32.	Monroe County Homesteads	405 Terminal Bldg., Rochester, N. Y.			Not started	
N. CAROLINA	3.	Penderlea Homesteads	Wilmington, N. C.	Hugh MacRae	W. H. Schaefer	$1,000,000 alloc. for 300 houses	No heat
OHIO	10.	Mahoning Garden Homesteads	301 Federal Bldg., Youngstown, Ohio	Philip Schaff	C. J. Schmid	Not started	
OHIO	12.	First Homestead Unit of Dayton	1125 U. B. Bldg., Dayton, Ohio	H. H. Peterson	Mary F. Peirce	$50,000 allocated for 35 houses	
OHIO	38.	4-New Dayton	1125 U. B. Bldg., Dayton, Ohio	H. H. Peterson	Mary F. Peirce	Not started	
OKLAHOMA	55.	Tulsa County Homesteads	Tulsa, Okla.			Not started	
PENNSYLVANIA	6.	Westmoreland Homesteads	Box 157, Greensburg, Pa.	D. W. Day	J. H. Feather	$625,000 alloc. for 250 houses	Tenants furnish own heating
S. CAROLINA	40.	Greenville Homesteads	Taylors, S. C.	R. W. Hudgens, Greenville. S. C.		Not started	
S. CAROLINA	41.	La France Homesteads	La France, S. C.	R. W. Hudgens, Greenville, S. C.		Not started	
TENNESSEE	19.	Cumberland Homesteads	Crossville, Tenn.	F. O. Clark	L. E. Ford	$825,000 allocated for 350 houses	Fireplaces
TEXAS	21.	Houston Gardens	Gulf Bldg., Houston, Tex.	C. R. Brace	W. L. Conover	$280,000 allocated for 100 houses	No heat
TEXAS	22.	Dalworthington Gardens	205 S. Houston St., Dallas, Texas	J. T. Orr	J. L. Wallace	$250,000 allocated for 80 houses	No heat
TEXAS	23.	Wichita Gardens	Room 320, Federal Bldg., Wichita Falls, Texas	W. A. Canon	J. K. King	$171,000 allocated for 62 houses	No heat
TEXAS	24.	Three Rivers Gardens	Three Rivers, Texas	C. R. Tips	H. B. Drennan	$125,000 allocated for 50 houses	No heat
TEXAS	25.	Beauxart Gardens	201 New P.O. Bldg., Beaumont, Texas	Herman Weber	C. G. Hunter	$125,000 allocated for 50 houses	No heat
TEXAS	47.	Marshall Gardens	Marshall, Texas			Not started	No heat contemplated
VIRGINIA	48.	Shenandoah Park Homesteads	Luray, Virginia	F. C. Hanrahan			No heat
VIRGIN ISLANDS	60.	Virgin Islands Homesteads	St. Thomas, Virgin Islands	H. E. Taylor	B. J. Brown		
WASHINGTON	36.	Longview Homesteads	Post Office Bldg., Longview, Wash.	A. E. West (Acting)		Not started	
W. VIRGINIA	13.	Reedsville Experimental Community	Reedsville, W. Va.	G. M. Flynn (Admin. Officer)	G. M. Flynn	50 houses completed	Stoves
W. VIRGINIA	7.	Tygart Valley Homesteads	Elkins, W. Va.	L. W. Coberly	F. E. Tolbard	$675,000 allocated for 270 houses	Tenants supply own heating
—	62.	Indian Projects	(Location undetermined)				

(Left) Mrs. Roosevelt addressing homesteaders at Crossville, Tenn., last spring. (Right) A homestead, part of the Reedsville Experimental Community, W. Va., the first of the Subsistence projects.

ized a corporation, named Federal Subsistence Homesteads Corporation, which acts as the lending agency of the Division. Local corporations are formed for the development and operation of particular projects. FSHC controls the activities and policies of the local corporations through complete stock ownership of the subsidiary local corporations. The subsidiary corporation borrows money from FSHC and, in turn, gives financial assistance to selected homesteaders. The subsidiary corporation is not operated for profit. Complete responsibility for the operation of the project is placed with the board of directors of the subsidiary corporation, but the selection of officers and other personnel, rates of compensation, financial policies and general operating powers, plans and policies are subject to the approval of the Division and of FSHC.

Who Finances Them

Federal funds advanced are loans; grants will not be made. Except in special cases, preference is given to projects toward which reasonable equity contributions are made from sources other than the Federal Government. Loans are made to the local corporations, not to individual homesteaders. All loans must be adequately secured and are at an interest rate of 4% to the corporation, amortized over a period not to exceed 30 years with privilege of repayment at any time. The interest rate to the homesteader will usually be somewhat higher in order to provide a reasonable differential for the necessary annual management costs of the corporation. Amortization schedules will be adjusted to the character of project, prospective earning power of the homesteaders, quality and character of construction.

How They Operate

Subsistence homesteads are ordinarily established and administered in groups, accommodating from 25 to 100 families, and in exceptional cases a larger number. An individual "homestead" ordinarily consists of from one to five acres, depending upon soil, size of family, character of agricultural operations contemplated, opportunity for wage employment off the homestead, and other factors. On this plot the family is expected to raise vegetables and fruit, and depending upon circumstances, poultry and possibly a pig or two; in some cases a cow will be kept. Production is on a subsistence basis for the household use of the family and not for sale in the market. Home processing and storage of food products is encouraged. Home and small local industries are fostered to aid in supplying clothing and other necessities and to develop sources of supplementary cash income.

Who Plans Them

Projects are planned, organized, and administered with a maximum of local initiative and responsibility consistent with adequate general supervision and guidance by the Division and protection for the Federal funds advanced.

Projects are planned and organized in cooperation with the State Agricultural Colleges, Experiment Stations, and Extension Services; relief, welfare and other civic agencies, and with other State and local agencies whose fields are involved and whose services will contribute to the success of the project. Full use is made of the best technical experience and information available, both in general planning and in the more detailed planning of the particular project itself.

Construction

The homestead developments are laid out and constructed in accordance with approved planning, architectural and engineering practice. While the structures and other facilities must necessarily be moderate in cost, they conform to standards of convenience, durability, sanitation, and attractiveness with sufficient variation in design to avoid monotony. Availability of highways or other transportation facilities, and proper facilities for health, sanitation, comfort, and essential utility services are required. Architectural and engineering plans, specifications and costs are subject to approval by the Division.

Prospective homesteaders will in so far as possible perform, under competent supervision, the various constructional and other activities connected with preparing and improving their homesteads for occupancy and operation. It is the policy of the division to encourage the fullest possible use of the homesteader's labor on his own homestead. His otherwise unemployed labor will thus be advantageously utilized to establish a substan-

(Concluded on page 68)

EDITORIALS

The Contractors' Code Hearing

When on November 8, a hearing was held in Washington on the definitions set up in the NRA Code of the heating, piping, and air conditioning branch of the construction industry, there was a flood of protests concerning the scope of the definitions. Protests were filed by many organized groups of manufacturers, by organized dealers, and by a number of individual firms. Supporting the present definitions were the contractors' association and the organized steamfitters.

Protesting manufacturers asserted that their installation work should not come under the code provisions which require payment of a wage scale based on union prices and call for the filing of plans, and payment of code costs. The contractors asserted their belief that the code set up a fair method of competition and felt that all who do installation work should operate on the same basis of wages and bidding.

At present the situation is that the various manufacturers operate on exemption from the provisions of the code. As a result of the hearing NRA is left to make a ruling as to whether or not the present definition shall stand, and as to the status of manufacturers and dealers who do installation work. It was broadly hinted that if the decision goes against the protestants there will be a court battle. Until NRA rules there is little on which to base a judgment as to the course which events will take.

What lies at the basis of the controversy are the varying methods used to get equipment installed. Specialty makers have long maintained installation departments. They have felt that installation of their equipment required specially trained mechanics, and have stated that they cannot depend on their equipment being correctly put in unless such men do it. Such men are in their direct employ, are often not union men, and not paid the union scale. Similarly, some few large industrial concerns keep their own crew of millwrights to do their own installation and maintenance, and pay them on a scale based on the labor rates prevalent in their shops. Contractors who do a general line of work employ mechanics of their own, and likewise pay them at prevailing rates. If the definition holds and if all installation has to be done in accordance with the code provisions, then the mechanics doing it would have to be paid at the code rates. If the contractors can succeed in making the code stick it will open up much work which they are now ruled out of because of their inability to compete on labor prices. The present practices are so well established that it is little wonder that there is active protest against the code arrangement. Here are all the elements for a determined fight, but also it should not be forgotten that no one knows what is going to come about when the NIRA runs out next June.

●

Whole Building Construction Program Deserves Support

That the Federal plans to promote building recovery deserve full cooperation and support becomes more evident right along as the full meaning of the Housing Act and policy of the Administration develops. Regulations to cover Titles II and III were published recently and indicate an attempt to straighten out the troublesome mortgage investment problems on a reasonable basis. The regulations were followed by a public announcement by the Administrator that it is the hope of officials that the impetus given to building will not turn into another boom. Rather it is hoped to stimu'ate building into a sound and steady activity. We have had enough of booms to last quite a while, and there will be few who do not agree that a steady activity is greatly to be preferred.

All along those who were most active in formulating the plan which finally turned into the Housing Act made it a cardinal principle that the work was to be financed privately with government help only in the form of insurance. Moreover, it was to be a plan to help the building industry help *itself*. Not only were these features put into the plan but now it appears that this plan is to be made the basis of attempts to keep Congress from going to extremes in making public money available through PWA methods. The success will depend to some extent on the showing made in getting the full Housing Act working in the next month or two.

At the same time plans are under way to help the distressed commercial and office buildings out of their financial troubles by making refinancing possible. This will help to remove a sore spot and give another means of making private money available for new construction. Steadily the financial mess left over from the boom period is being adjusted. Already a few institutions have advertised that they have money available for mortgage loans on commercial property.

As long as the government activities to stimulate building of all kinds continue to move along their present lines we are all fully justified in continuing the active support which has been given to the modernizing phases of the plans. We are probably more than merely justified; support borders on a duty. There will shortly be more instructions as to our specific share of work to be done. Let us all be ready to do it.

●

Air Conditioning in 1934

Reports from the field are now making it possible to get a line on how air conditioning has fared during 1934. It seems apparent that the average size of installation made did not change materially from 1933. Installations were made, however, in considerably different places. Retail stores, theatres, and offices accounted for well over half of the refrigeration tonnage reported and the average installation in places of this kind was about 50 tons. Industrial applications account for about 15% of the tonnage of refrigeration applied to air conditioning during the year. Little or no progress is reported in applying mechanical cooling to residences. More complete figures may change the details slightly but it is doubtful if the essential facts will be altered appreciably.

Two comments come to mind in connection with the reports. One is that slowly the statistical and factual material on air conditioning is getting into such shape that statements covering it can be made with some degree of conviction. The other is that the predictions of the careful analysts as to the course that air conditioning wou'd take are being borne out. Those who, two or three years ago, saw an immediate market of fantastic proportions in the artificial cooling of residences are seeing their expectations blasted.

ABSTRACTS of Current Papers, Books and Pamphlets

Designing Insulation into Farm Buildings

Farm buildings, unlike most other buildings, rely mainly upon animal heat, rather than on heat from mechanical appliances, for maintaining the desired inside temperature. Heating apparatus is used only during short periods of extremely cold weather. During the rest of the time animal heat warms the buildings. Thus in designing a farm building the problem is to determine what heat resistance is to be built in the walls and roof. In other buildings the problem is usually just the opposite; that is, to find how much heat is necessary to take care of the heat losses.

The problem of providing a factor of safety for the heating is also different than in most buildings. Usually, it is provided for by installing a larger size heating plant or, in other words, by allowing for a greater heat loss than calculations show. In farm buildings the safety factor must be allowed in the increased resistance of the walls and roof to heat flow.

To illustrate the method of design, the author selects a small poultry house which has a capacity of 150 hens. After selecting the minimum indoor temperature and humidity desired and the average outside normal temperature and maximum outside humidity, he determines the amount of heat produced by the hens. The following formula is then used to determine the required coefficient of transmission of the wall and roof.

$$H = (A_1U_1 + A_2U_2 + A_3U_3 + A_4U_4) \times (t_1 - t_0) + \frac{I(t_1 - t_0)}{53} + \frac{V(t_1 - t_0)}{53}$$

where

H = Heat of animals (Heat required to maintain inside temperature)
A_1U_1 = Net wall and roof area, sq. ft. × coefficient
A_2U_2 = Net glass area, sq. ft. × coefficient
A_3U_3 = Net door area, sq. ft. × coefficient
A_4U_4 = Net floor area, sq. ft. × coefficient
I_1 = Window infiltration, cu. ft. per hr.
I_2 = Door Infiltration, cu. ft. per hr.
I = Total infiltration = $I_1 - I_2$, cu. ft. per hr.
V = Air admitted for ventilation, cu. ft. per hr.
53 = Cu. ft. of air raised one deg. by 1 B.t.u.
$(t_1 - t_0)$ = Design temperature difference.

The standard coefficients for glass, doors, floors, window infiltration, and door infiltration are used and the wall and roof coefficient U_1 is solved for. After U_1 is determined, it is only necessary to specify a wall and roof to meet this coefficient.

[*"Designing Insulation into Farm Buildings," by G. D. Andrews; presented at the 28th annual meeting of the Farm Structures Division of the American Society of Agricultural Engineers, Detroit, June,* 1934; *approximately* 2000 *words.*]

●

Heating with Electricity

Warming buildings with electricity is receiving a great amount of attention in England and quite a number of installations have been made in the past year. Electric companies in the British Isles have offered many inducements to further the use of electricity during off-peak hours.

The object of this book is to acquaint engineers with this method of heating so that they may handle electric warming problems successfully. In the preface, the author states that he assumes that the reader already has a knowledge of electricity so that the fundamentals are treated briefly while the subject of heat is treated more fully. As far as the author knows, this is the only book available on warming buildings with electricity.

In the chapter on the warming effect of electric heaters, a considerable amount of space is devoted to a very interesting and instructive discussion of the physiological factors of heating. The chapter also includes the warming of rooms by convection and radiation and describes the apparatus used.

With any heating system using off-peak power, thermal storage plants are a necessity. The main characteristics of the storage medium are high specific heat and cheapness. Although oil because of its higher boiling point has been tried, water is the medium employed in most cases. There are two important drawbacks to the use of oil; the higher cost and the fact that it cannot be used directly in the heating system and needs a heat transfer unit to transfer the heat to the water. The author discusses very clearly the various details of the thermal storage plant including the insulation of the tanks, the thermostatic control of the water temperature, thermostatic mixing valve, electrode boilers, and circulating pumps. This chapter occupies the major portion of the book.

Because of the mild climate, there is a considerable market for electric heating in England. In the section around London the temperature rarely reaches freezing for more than a few days at a time. The average winter temperature in London is 43° which is only 10° below the average indoor temperature used. In the United States, electric heating has been limited to small sections of the country where the winters are mild and electricity relatively cheap.

This book is recommended for its completeness and will serve as a valuable reference, particularly on the subject of thermal storage in heating systems.

[*"Warming Buildings by Electricity," by Frank C. Smith; published by E. & F. N. Spon, London; obtainable from the Engineers Book Shop,* 227 *Park Ave., New York. Cloth-bound;* 162 *pages;* 6 *in.* × 9 *in.; price,* $3.50.]

●

Requirements for Gas Heating Appliances

Five new booklets covering the minimum standards for performance, safe operation, and substantial and durable construction of gas heating appliances have been published by the American Gas Association. The requirements follow the same form as the previous standards sponsored by the A.G.A. and all have been approved by the American Standards Association. The devices covered are central heating gas appliances, gas conversion burners, gas unit heaters, industrial gas boilers, and gas burner valves. The standards will become effective January 1, 1935.

[*"Approval Requirements for Central Heating Gas Appliances, Z21.13-1934; Approval Requirements for Gas Unit Heaters, Z21.16-1934; Approval Requirements for Industrial Gas Boilers, Z21.14-1934; Listing Requirements for Gas Conversion Burners, Z21.17-1934; Listing Requirements for Gas Burner Valves, Z21.15-1934." Obtainable from American Gas Association, 420 Lexington Ave., New York; Price,* 40c *each except for last one which is* 30c.]

●

Pulsating Air Flow

Whenever air is caused to move by mechanical means, the resulting air velocity is pulsating in nature. Recent experiments demonstrated that the discharge of air blowers pulsates much more than was previously realized. This same condition is also present in air flow actuated by propellers and ventilating fans. This pulsation causes errors in velocity measurements that are often as great

as 20% when the conventional pitot tube or orifice is used with a liquid manometer, and it causes an increase in the velocity-energy and fluid friction loss that can easily reach 50%.

The author of this paper has developed a simple instrument which he claims will give the true average air velocity for any amount of pulsation. In this instrument, the air velocity creates a water velocity through a submerged orifice, and this water velocity is always proportional to the air velocity at that instant, and can therefore be used to determine the true average velocity, regardless of the amount of pulsation.

[*"Pulsating Air Flow," by Neil P. Bailey. Paper No. PTC-56-1; to be presented at the annual meeting of the American Society of Mechanical Engineers, December 3-7, 1934, New York. Approximately 5000 words.*]

●

Design and Performance of an Axial-Flow Fan

This paper is the result of an investigation of the design and performance of an axial-flow fan for use with comparatively high pressures. It was believed that the performance of the present fans could be improved and the noise reduced by applying aerodynamic principles to the design. The design of the new fan is discussed briefly and the completed fan is fully described.

The performance of the fan was tested and compared with that of the old fan. The results of the tests are shown by a series of graphs. The noise emission was also measured and was found to be considerably lower than that from the original fan.

[*"The Design and Performance of an Axial-Flow Fan," by L. S. Marks and J. R. Weske. Paper No. AER-56-13; to be presented at the annual meeting of the American Society of Mechanical Engineers, December 3-7, 1934, New York; approximately 4000 words.*]

●

Radiation of Heat from the Human Body

A study of the radiation of heat from the human body and of the apparatus used for the measurement of this heat has recently been made and the results published in the form of three booklets. The first part of the report describes a radiometric instrument, built by the author, for measuring the radiation and temperature of the skin. The second section discusses three other methods of making measurements and compares the accuracy of the methods. It was found that the accuracy of the other instruments varied from 0.5° C. to 5° C. while the accuracy of the instrument described in the first paper was 0.1° C.

The third paper is perhaps the most interesting of the three in that it discusses the human skin as a black body radiator. In the past, the human skin has been assumed to act as a perfect black body. If this assumption is true, the human skin will not reflect heat rays but will be a perfect absorbing and radiating body.

According to the law of Kirchoff, the ratio of the radiating power is the same for all bodies at the same temperature, and therefore a body which absorbs perfectly must radiate perfectly. For that reason a perfect radiator is often referred to as a perfect black body. Surfaces such as polished metal radiate practically nothing, whereas other surfaces such as black paint pigment radiate within a few per cent of the theoretical black body. The human skin has its place among other radiators as regards its emissive power and upon the value of this quantity depends the whole technique of skin temperature measurements by means of radiometric instruments.

It is obvious that the skin, whether white or negro, is not truly black, and measurements show that the reflecting power of even the blackest skin is considerably above zero. The question may then arise as to how the white skin can radiate so perfectly when it is not black. The answer lies in the fact that the ability of the skin to reflect the shorter wave lengths (light) does not preclude the possibility of its absorbing, and, therefore, radiating almost perfectly the longer wave lengths (heat). Thus, the visible color of the skin is of no importance as far as the radiating power of the skin is concerned. To test this the following more or less qualitative experiment was performed.

A white subject, parts of whose back had been coated with an absorbing black paint, was measured several times and comparison made between the radiation values of the blackened and unblackened surfaces. No significant difference could be detected between the two, although the unblackened surfaces radiated slightly more than the blackened surface.

The report also states that it was found that the presence of water vapor and CO_2 in the layers of air next to the skin does not appreciably affect the radiation from the surface.

[*"The Radiation of Heat from the Human Body," by James D. Hardy. Reprinted in booklet form in three parts from The Journal of Clinical Investigation, Vol. XIII, No. 4, July, 1934.*]

●

Influence of Discharge Obstructions on Centrifugal Fan Performance

Many engineers have held that the performance of centrifugal fans was influenced by the form and dimensions of the discharge duct immediately adjacent to the discharge outlet. It has already been shown that a poor inlet box or duct may reduce the capacity of the fan as much as 40%. The object of this investigation was to determine whether bends or obstructions close to the discharge would have a similar influence.

Two commonly occurring arrangements of the discharge were selected for investigation, 90° bend and tee discharge ducts. As the discharge outlet in the fan housing was square, it was possible to test with the 90° bend in two different orientations, discharging vertically upward and discharging laterally. Discharging vertically upward, the air passes through the bend with the same direction of rotation that it had when passing through the fan; while discharging laterally, the direction of rotation is changed to a plane at 90° to that in the fan. The tee discharge duct consists of a short duct 14 in. long, 36 in. square and connecting with a larger duct, 44 in. square, with a sudden enlargement.

Test results for a straight discharge duct and a 90° bend provided with guide vanes were practically identical. This indicates that the resistance of the 90° bend is negligible and that its presence does not affect perceptibly the action of the fan. When there were no vanes in the 90° bend the loss was found to be the same as if the bend was placed in a more remote location in the discharge duct. The vaneless bend had no effect on the fan performance.

It would appear that the only effect of the tee duct is to increase the resistance on the discharge side and that it has no influence on the fan performance.

It may be concluded from this investigation that the operation of the fan tested was not affected to any appreciable extent by sudden enlargement or change of direction of the air stream as it left the fan housing. It is the opinion of the authors that the conclusions stated may be applied quite generally whenever the fan housing is sufficiently complete to give discharge air a general direction of flow and a uniform distribution at the outlet. Any extension of the conclusion, however, to other types of fan and other arrangements of housing must be based largely on opinion.

[*"Influence of Bends or Obstructions at the Fan Discharge Outlet on the Performance of Centrifugal Fans," by L. S. Marks, J. H. Raub, and H. R. Pratt. To be presented at the annual meeting of The American Society of Mechanical Engineers, December 3-7, 1934, New York.*]

NEWS OF THE MONTH

Boston District Heating Engineers Meet, Elect New Officers

BOSTON—The first fall meeting of the Boston Section of the National District Heating Association was held during the afternoon and evening of November 7. The purpose of the meeting was to bring the recent Rochester convention to local members who were unable to attend the annual meeting.

D. S. Boyden presented the report of the committee on operating statistics. He touched briefly on the financial standing of the district heating industry as a whole. P. T. Reuter, Bailey Meter Company, abstracted the report on meters and accessories, discussing the effect of pipe diameter on the function of flow meters and various tests on flow meter capacity at various pressures. He closed the paper with a brief talk on the effect of regulating valve pulsation on flow meter operation.

J. F. Treat, Pittsfield Electric Company, presented the distribution committee's report, which covered the insulation and lubrication of slip joints, design of manhole covers and frames, and the economics of insulating slip joints.

At the conclusion of Mr. Treat's paper, Mr. Boyden moved that the Boston Section make a formal request to the distribution committee of N.D.H.A. to prepare further data on soil temperatures encountered around a steam main. This will necessitate further study on the lateral temperature gradient around the mains

During discussion of Mr. Treat's paper, Mr. Saurwein explained the type of expansion joint used in the steam tunnels at Harvard University, and Mr. Engle asked Mr. Saurwein to send a drawing to the national distribution committee.

Robert Kreisinger, Cambridge Electric Light Company, spoke briefly on European practice in central station heating. Mr. Kreisinger described briefly the hot water system used in Leningrad, Dresden, and other European cities.

D. E. Washburn, Boston Edison Company, presenting the report of the commercial relations committee, discussed the degree-day method of determining heating requirements and various methods of automatically controlling steam consumption in buildings.

Since part of this paper was written originally by J. E. Wattles, the latter was called upon to deliver that part he had written, on temperature trend and its relation to the determination of the heating requirements of a building. At the conclusion of this paper, Mr. Engle moved that a suggestion be sent to the commercial relations committee that they standardize the method of determining the cubical contents of a building, while Mr. Washburn was requested to correspond further with that committee relative to use of a movable base in computing the degree-day.

N. S. Wade, Boston Edison Company, presented a paper on steam station engineering.

H. W. Frederick, Harvard University, in his paper, the report of the research committee, dealt chiefly with the application and selection of reducing valves. He also included a comparison of the various formulas for computing pressure drops. At its conclusion Mr. Saurwein suggested that further data on flow formulas be obtained. J. W. Wattles presented the report of the sales development committee.

The following officers were elected: Chairman, G. K. Saurwein, engineering department, Harvard University; vice-chairman, M. D. Engle, Edison Electric Illuminating Company of Boston; secretary, H. W. Frederick, assistant to Mr. Saurwein at Harvard; treasurer, R. M. Nee, head of engineering department, Boston Edison; executive committee—W. T. Jones; E. D. Learned, district power sales manager, New England Power Company; C. F. Mosher, general superintendent, Pittsfield Electric Company; D. S. Boyden, superintendent steam heating service, Boston Edison.

Chicago Has 607 A.C. Jobs, 228 Installed This Year. Average Horsepower is 67.5

CHICAGO—There were 607 air conditioning installations on the lines of the Commonwealth Edison Company here as of October 31. These had a connected load of over 41.000 hp.

Of the total installations, 253 were made prior to 1933, 126 were made during 1933, and 228 were added during the first 10 months of this year.

The installations made prior to 1933 were larger on the average than those during the last two years. The average horsepower of the jobs made prior to 1933 was 127, while this figure was 24.8 for the 1933 installations, and 25.6 for the 1934 jobs, with an average of all plants of 67.5 hp.

The detailed figures follow:

	Prior to 1033		1933		1934 (10 Mos.)		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Banks	4	1006	1	200	3	46½	8	1252½
Brokers and Exchanges	4	694½	2	26½	2	41	8	762
Beauty Shops	1	4½	0	0	4	63¼	5	67¾
Churches	1	90	1	5	1	65	3	160
Civic Buildings	0	0	1	116½	0	0	1	116½
Clubs	3	357	1	2	0	0	4	359
Dance Halls	4	465	0	0	0	0	4	465
Dentists	0	0	2	1½	2	2	4	3½
Drug Companies	2	56	0	0	5	104¼	7	160¼
Hospitals	2	33	0	0	5	8½	7	41½
Hotels	13	3187½	3	94½	6	124	22	3406
Industrial								
Bakery	18	303	0	0	0	0	18	303
Candy	17	2471	3	203	4	381	24	3055
Printing	13	1800½	1	201½	4	43½	18	2045½
Miscellaneous	6	609	3	179	9	343¼	18	1131¼
Gen. Offices and Bldg.	18	4493½	9	265	24	926	51	5684½
Private Offices	22	68¼	38	62¾	49	131½	109	262½
Residences	9	14	11	15	24	43½	44	72½
Restaurant	41	1566	22	547½	25	443½	88	2557
Stores								
Candy	1	4	4	13½	3	5	8	22½
Dept. Clothing, Shoes	7	354	3	16¼	17	1130¾	27	1501
Food	7	385¾	0	0	0	0	7	385¾
Miscellaneous	2	215	4	448	1	2	7	665
Studios	1	346	1	9	1	12	3	367
Undertakers	3	50	2	10	5	42¼	10	102¼
Theaters	54	13517	14	703	34	1886	102	16106
Total	253	32090½	126	3119½	228	5844¾	607	41054¾

Beers Talks to Detroit A.S.H.V.E.

DETROIT — Seventy members of the Detroit chapter, A.S.H.V.E., participated in a discussion of stoker equipment at the November meeting. R. L. Beers, vice-president of the Detroit Stoker Company, gave a talk on stokers and answered a number of questions concerning this type of equipment afterward.

A share of the meeting was devoted to a discussion of the code and its enforcement and the present condition of business. The Rev. Frederick Siedenburg, director of the Detroit Regional Labor Board and executive dean of the University of Detroit, spoke on "Some Aspects of The New Deal."

Tapp Joins G. & B.

NEW YORK—Harry F. Tapp, whose resignation as executive secretary of the American Oil Burner Association was announced on these pages last month, has been made assistant to the president of the Gilbert & Barker Manufacturing Company, with headquarters in the RCA Building, Rockefeller Center. Mr. Tapp assumed his new position November 15.

Modern Coal Burner Acquired by Link-Belt

CHICAGO—Modern Coal Burner Company, a subsidiary of Peabody Coal Company, has relinquished its automatic stoker business and Link-Belt Company has acquired manufacturing and sales rights to the Modern stoker.

The Modern stokers will be added to the Link-Belt line. Stocks of parts have already been taken over by the Link-Belt stoker division, the company's Caldwell-Moore plant at 2410 West 18th St., Chicago. Modern's present dealers have been asked to continue to handle the line.

Link-Belt and Modern both have been building automatic stoker equipment for about five years, in sizes ranging from household size to 250 b.hp.

Bailey Opens Own Office

CLEVELAND—Edward P. Bailey, Jr., formerly with National Radiator Corp. and Bryant Heater & Mfg. Co., has opened an office at Mayfield Road and Lee Blvd. as air-conditioning consultant to public utilities and manufacturers. His counsel covers market analysis, selection of equipment, and merchandising programs.

E. P. Bailey

After graduation from Sheffield Scientific School, Yale University, in 1912, Mr. Bailey joined The Peoples Gas Light & Coke Co., Chicago, first in the manufacturing division, later as house-heating engineer. Upon return from the war he joined The Bryant Heater & Mfg. Co., Cleveland, serving successively as assistant branch manager, sales manager, and president.

He then went with National Radiator Corporation as general manager of the gas heating division, where he remained till 1933, when he was recalled to Cleveland by Bryant Heater as vice-president in charge of operations. He is vice-chairman of the Gas Heating Boiler, Furnace, and Conversion Burner Institute.

Kelvinator Corporation's new model home, pictured above, will be built near the company's plant in Detroit and will be open to all visitors to provide dramatic demonstration of the performance of the company's refrigeration, heating, and air conditioning products. Year round air conditioning will be a feature of the home.

National A. C. Bureau Proposed

BOSTON—Upward of 60 members and guests of the Air Conditioning Bureau of Boston attended the regular monthly dinner and meeting held in the Hotel Kenmore. The feature of the evening was an illustrated talk by Thayer Francis, Parks-Cramer Company, on Industrial Air Conditioning.

During the business session the matter of the formation of a national association, or council, of air conditioning bureaus and other organizations was discussed and the general sentiment was favorable. It was agreed that the Boston bureau would cooperate with all other organizations toward the formation of such a national council.

Harvey Addresses A.G.A. Convention

ATLANTIC CITY, N. J.—Lyle C. Harvey, Bryant Heater Company, addressed the American Gas Association convention here on "The Gas Industry's Next Opportunity." The convention was held at the Atlantic City Auditorium October 28-November 1.

Mr. Harvey called on the gas industry aggressively to promote year-round air conditioning with gas. He said that the public had been awakened to the desirability of comfort in theaters and restaurants and that homes are the next big market. He particularly urged emphasis on dehumidifying, using room cabinet units using $15 to $25 worth of gas in the summer; small central plants for homes and commercial establishments using $60 to $90 in gas for the season, and large plants for factories and office buildings with several thousand cubic feet consumption per hour.

Victor Starzenski and T. W. Hallorar of the New York Power and Light Corp., Albany, N. Y., addressed the convention on "Why a Major House-Heating Campaign? Its Advantages and Results." J. C. Patterson, Bryant Heater Company, described "How Gas Companies Should Prepare for Summer Air Conditioning Sales." In his opinion, policies should be set up by utilities to promote air conditioning, selection and training of adequate personnel, and supply proper engineering publicity and advertising.

The manufacturers' session was addressed by Beverly S. King, NRA deputy administrator, who asked for greater cooperation with and among the manufacturers. George E. Frazer, Chicago, counsel for the Gas Appliances Institute, told of important problems which are arising in connection with NRA and asked for an early solution.

Percy S. Young, Public Service Electric & Gas Company, New Jersey, was elected president of A.G.A. for the coming year.

New Frigidaire Dealer in Hartford

HARTFORD — Tychsen & Company, headed by Samuel and Peter N. Tychsen, has taken over the distribution of Frigidaire refrigerating and air conditioning equipment formerly handled in this territory by the Frigidaire Sales Corporation of New England. Showrooms have been opened at 100 Allyn Street.

H. B. Kingsbury is sales manager for the company.

Consulting Engineers Aid in Modernizing

SEATTLE—The old shack which was modernized as a demonstration in Seattle's Civic Modernizing Campaign, is now completely made over into a modern dwelling.

The Associated Consulting Engineers of Washington were responsible for the design of the heating which includes a warm-air furnace type conditioner, fired by an oil burner.

1183 Gas Jobs in Kansas City

KANSAS CITY, MO.—The Gas Service Company started a house-heating campaign here October 29. Customers who purchase space heaters and conversion burners have until February 1, 1935, to decide whether gas heating is satisfactory, and if not, they can turn back the equipment to the utility and the money will be refunded.

The campaign, which will continue through November, is expected to add to the 1893 house-heating installations on the company's lines. Of these, the utility sold 1140 central house-heating Jobs from July 5 to October 20.

St. Louis Gas Jobs Increase Sharply

ST. LOUIS—St. Louisians are turning more than ever to smokeless fuel, according to Victor J. Azbe, a member of the Citizens' Smoke Abatement League. According to Mr. Azbe, distributors of gas heating and other smokeless burners have reported sales increases in 1934, especially the Laclede Gas Light Company, which installed two-and-a-half times as many gas burners during the first 10 months of 1934 as it did in the year preceding.

Utility Resumes Appliance Selling

BRIDGEPORT, CONN.—Active merchandising of gas appliances, including heating equipment, will be resumed by the Bridgeport Gas Light Company after a lapse of many years. Ronald A. Malony, for 11 years an executive of the Philadelphia Gas Works Company, and former chairman of the refrigeration committee, American Gas Association, has been named sales manager.

Gas Rate Cut in Danbury

DANBURY, CONN.—An additional rate schedule for general gas service, setting a net rate of $3.60 for the first 3,000 cu. ft. or less used per month, and four cents per 100 cu. ft. for all gas used monthly above that amount, has been announced by The Danbury & Bethel Gas & Electric Light Company.

The $3.60 figure is set as the minimum charge per month under this schedule, which applies when the maximum requirement is at the rate of 120 cu. ft. per hr. or less. The company will make a capacity charge of 20 cents per month for each 10 cu. ft. in excess of the stipulated 120 ft. maximum hourly requirement.

The new schedule is expected to be of particular benefit to consumers using gas for house-heating purposes. The same company has also announced reduced rate schedules for users of electric energy which may increase the power load for automatic heating and air conditioning equipment employing electricity.

Dr. Hill Addresses Chicago Chapter

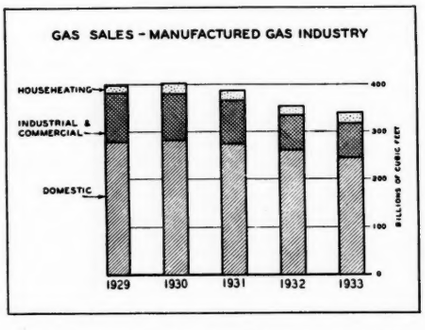
CHICAGO—The November meeting of the Illinois Chapter, A.S.H.V.E., was held at the Hotel Sherman, with an attendance of 106.

First vice-president John Howatt introduced the speaker of the evening, Dr. E. V. Hill. Mr. Howatt briefly outlined the field of air conditioning for the next few years, declaring that the industry must look to the remodeling of existing buildings for its business.

Doctor Hill briefly sketched his work during the last 20 years, giving credit to Messrs. Aeberly, Armspach, and others in the Chicago Department of Health for their work in 1917 on the synthetic air chart, and its adoption in 1920. In 1922, he first insisted that the term, "fresh air," should not be used when "outdoor air" is meant, it being a question of air quality, and not quantity.

Doctor Hill's talk was illustrated by a number of most interesting slides, which began with an outline history of early man's contact with the world and his struggle for cleanliness, food and drink, and a healthful air supply.

Doctor Hill insisted that outside air is not fresh, but contains dust, carbon monoxide, and bacteria, and is not only a nuisance, but a menace to health as well. He furnished numerous health department charts showing the seasonal death rate of pneumonia, heart disease, and nephritis, and stated that these rates are advancing. Doctor Hill suggested that people sleep in a warm room, believes that the comfort curve parallels the wet bulb temperature. He feels convinced that the comfort curve will have to be revised. Apparently, we must also consider air pressure and oxygen therapy in the treating of disease.



According to the American Gas Association, manufactured gas companies sold 20.7 billion cu. ft. of gas for building heating in 1933

Gage Standards Now in Tentative Form

NEW YORK—A proposed American Standard for pressure and vacuum gages (gage sizes, mounting dimensions, size and type of connections of gages and cocks, indicator hands, and stop pins) has recently been completed by subcommittee No. 3 of the A.S.M.E. sectional committee on the standardization of pressure and vacuum gages.

This standard is now in tentative form for discussion, and criticism and comment will be welcomed. All communications should be addressed to C. B. LePage, assistant secretary, American Society of Mechanical Engineers, 29 West 39th St., New York.

The committee consists of 42 men representing 34 national organizations and government departments, composed of manufacturers, consumers, and general interests.

Insane Hospital Has New Plant

BOSTON—A new central steam heating plant to serve present buildings and five new additional buildings now being erected at the Boston State Hospital for insane at Mattapan is now under construction and will shortly be completed. It includes about 14,000 ft. of underground mains from the central boiler house to the various buildings, ranging in size up to 12-in. in diameter.

The plant consists of four water tube boilers, each of 400 hp., with space for a fifth when needed. They are arranged in two batteries, with setting for oil and pulverized coal fuels. Burners are National Airoil. Boilers are by the International Engineering Company, and the underground mains by the Underground Steam Construction Company. R. D. Kimball & Company are the engineers.

Fuel oil is stored in three 32,000-gal. steel tanks, built into old coal pockets, with the fill pipes passed down through the roofs of the pockets. Pumps deliver oil at 100-lb. pressure through steam preheaters.

Maximum daily steam requirements approximate 1,300,000-lb. when all the new buildings are in commission. This plant also generates electricity for the entire group of buildings.

Forms Servicing Organization

SPRINGFIELD, MASS.—Albee Engineering Company has opened an establishment at 26 Taylor Street for the servicing of Frigidaire commercial refrigeration and air conditioning equipment in the metropolitan Springfield area. The new service plant is under the direction of Milton J. Bearg, who for some years has been a consulting engineer on air conditioning and was formerly with the Air Conditioning and Cooling Corporation, New York.

Boston Steam Service Adds 34 Customers

BOSTON—Thirty-four new customers have been added by the Boston Edison Company's district steam service this fall, making an increase of 6.3% in connected load to November 8, and a 15% increase in number of customers. Among the new customers is Hotel Essex, opposite the South Station, which uses the service for heating, dishwashing, and steam table. A number of the other customers use the service for pressing machines. The Edison Company has recently made a number of short main extensions.

Kelvinator Expands "Hot Room" Facilities

DETROIT—Kelvinator Corporation has opened, at its Plymouth Road plant, a new "hot room" for checking the performance of its products, designed principally for studying the reactions of air conditioning apparatus and refrigerators operating under excessive temperatures and other adverse conditions.

The room is 35 x 17 ft. in plan. Heated by air forced into it through ducts leading from a fin coil, the laboratory can maintain desired temperatures without a variation of more than 1° plus or minus.

KDKA Gets A.C. Studios

EAST PITTSBURGH—Moving into new and specially designed quarters, KDKA, the pioneer broadcasting station in the world, now has broadcasting facilities which are among the finest and most modern in the country. Noteworthy features include air conditioning, glareless lighting, special soundproofing, precise acoustical treatment, and ultra-concentrated control. The 17,000 sq. ft. of floor space provides for five studios.

Due to the rather large number of people and the several thousand watts of lighting in the rooms there is a need for a cooling system. The conditioning employed is of the closed circuit type, with the equipment installed at one central point. The conditioned air is carried from this point to the studios by means of ducts run along the ceiling. The fan provided for circulating the air can handle 7200 c.f.m. and is of sufficient conservative design to minimize noise. The blades are of the backward curved type and the discharge velocity is a little over 1000 f.p.m.

Two 15-ton compressors supply the necessary refrigeration. The system was designed to take care of summer conditions outdoors of 90°. The studios are to be held under these conditions at 80°, or 10° below outside temperature.

Warm Air Men to Meet in Pittsburgh, Discuss Codes, Visit Bureau of Mines

PITTSBURGH—The annual convention of the National Warm Air Heating and Air Conditioning Association will be held at the William Penn Hotel here December 4-6. Beverly S. King, NRA deputy administrator, and Charles E. Kettering, General Motors Corporation, are among the speakers scheduled.

This year is the first time this association has met in Pittsburgh, and the first opportunity many of the members have had to inspect the laboratories at the Bureau of Mines, so that Thursday afternoon the session will be held at the Bureau, where the members will be addressed by W. P. Yant, superintendent of the Pittsburgh station of the Bureau. He will be followed by Percy Nicholls, supervising engineer of the fuel section, who will present a short talk on fuel combustion in heating plants. Following these talks, members will be taken on a tour of the Bureau in small parties with guides.

The program follows:

DECEMBER 5—A. M.

President H. T. Richardson, chairman

Welcome to Pittsburgh—
W. C. Markle
Our President's Message—
President H. T. Richardson
The Federal Housing Program—
A. O. Eberhart, Federal Housing Administration
Layouts For Air Conditioning Including Mechanical Heating—
J. Earle Maynard
Our Technical Educational Committee—
J. H. Van Alsburg
The Industry's Installation Codes—
Prof. J. D. Hoffman

P. M.

Vice-president W. L. Rybolt, chairman

NRA Codes of Our Industry—
Address—Beverly S King, deputy Administrator NRA
Roofing and Sheet Metal Contracting Industry—
W. C. Markle
Furnace Manufacturing Industry—
A. W. Wrieden
Register Manufacturing Industry—
R. W. Blanchard
Furnace Pipe and Fittings Industry—
E. S. Moncrief
Address—
Charles E. Kettering
The Comfort Chart and Cold Wall Effect—
F. C. Houghten
Reports From Committee Chairmen:
Credit—
L. B. Murphy
Public Information—
A. F. Frazee
Membership—
R. W. Blanchard
Trade Relations—
F. E. Mehrings

DECEMBER 6—A. M.

Vice-president L. R. Taylor, chairman

Research Advisory Committee Report—
F. G. Sedgwick, chairman
The New Research Reference Volume—
E. A. Scott and Prof. J. D. Hoffman
Design and Performance Problems in Forced Air Heating and Air Conditioning—
Prof. A. P. Kratz
Studies in Summer Cooling in the Research Residence During the Summer of 1934—S. Konzo

P. M.

President H. T. Richardson, chairman

This session will be held in the U. S. Bureau of Mines.

Steel Heating Boiler Practice to be Simplified

WASHINGTON—A proposed simplified practice recommendation covering steel horizontal firebox heating boilers has been mailed to all interests in the industry by the division of simplified practice of the National Bureau of Standards for their consideration and written approval.

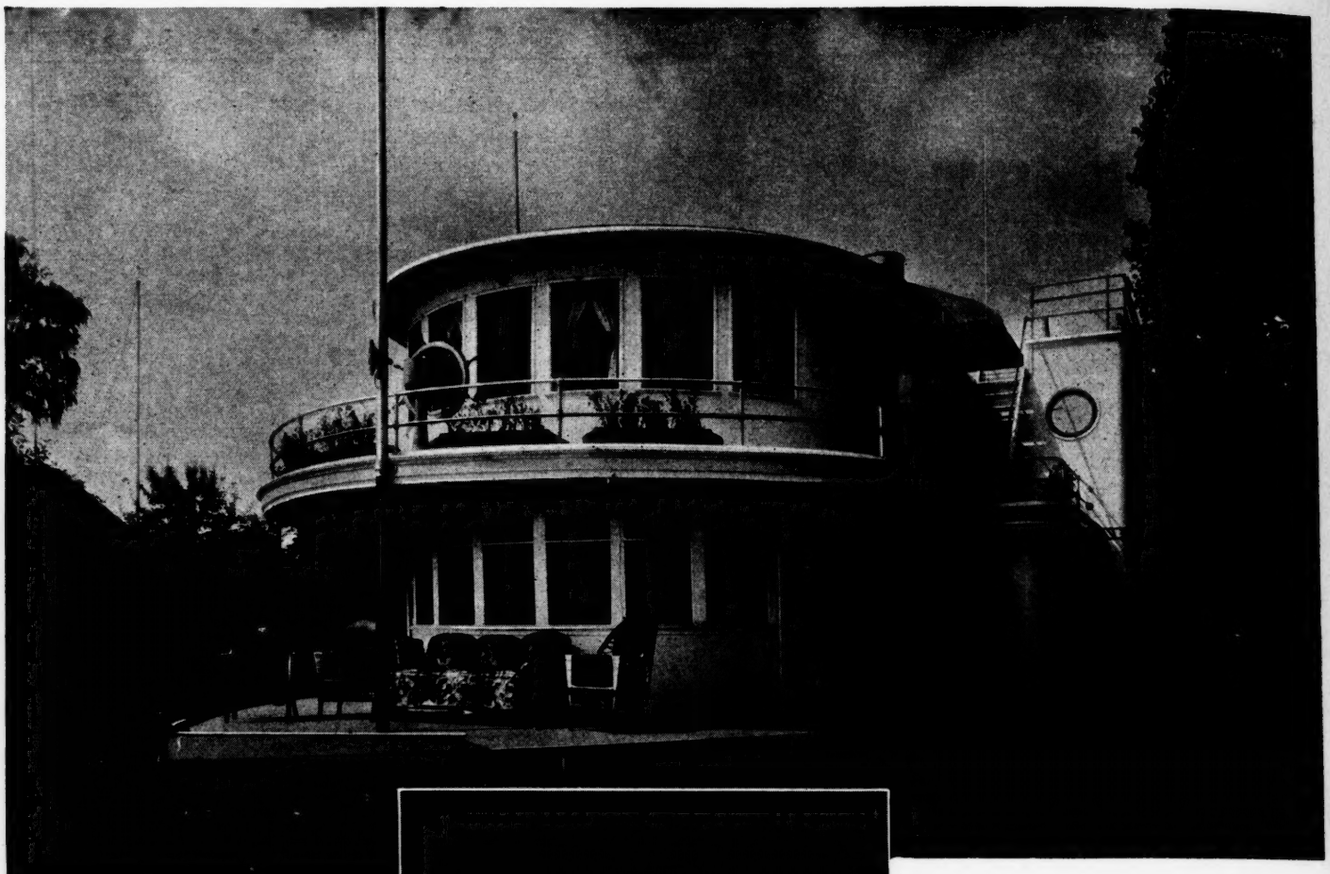
This recommendation, which was approved at a general conference held in Cleveland, June 5, lists 19 sizes of boilers ranging from 1800 to 35,000 sq. ft. of steam radiator and from 2880 to 56,000 sq. ft. of water radiator for hand firing. Nineteen ratings are also given for these boilers mechanically fired ranging from 2190 to 42,500 sq. ft. of steam radiator and from 3500 to 68,000 sq. ft. of water radiator. The recommendation also includes heating surface and grate area for each size of boiler. Other information includes furnace volume for oil, gas-fired, or bituminous coal-stoker-fired boilers, together with size of outlets and number and size of safety valves.

The recommendation, if approved by the industry, will be issued as simplified practice recommendation R157 and will be effective from July 1, 1935.

New Heating Plants in Massachusetts

SPRINGFIELD, MASS.—The contract for heating, ventilating, and air conditioning at the new $300,000 addition to the Federal Land Bank of this city, has been awarded to Jennison Co., Fitchburg.

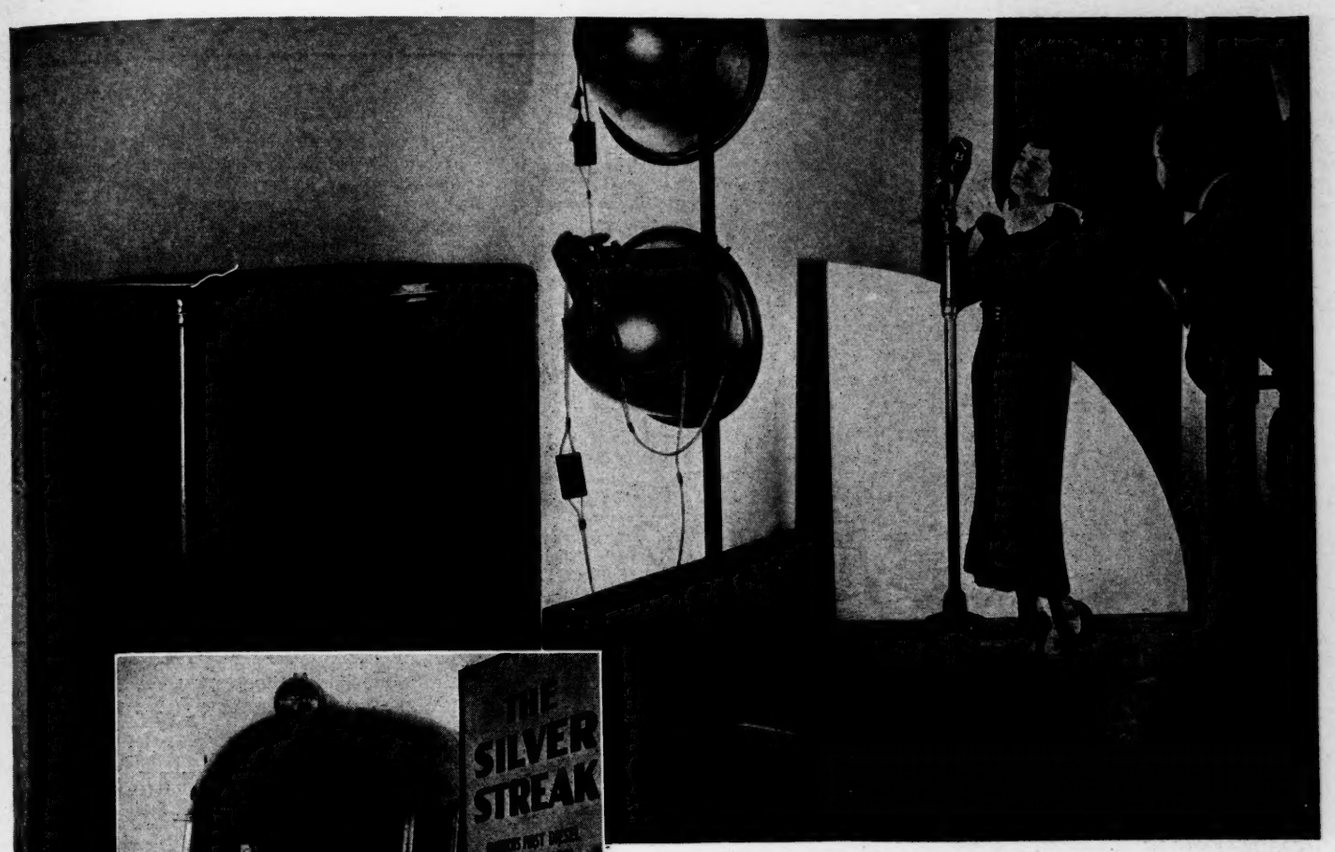
FITCHBURG—The Fitchburg school committee has voted to construct a new central heating plant for one of the city's schools at a cost of $17,000. S. W. Haynes Associates, 336 Main St., Fitchburg, have been selected to draw the plans.



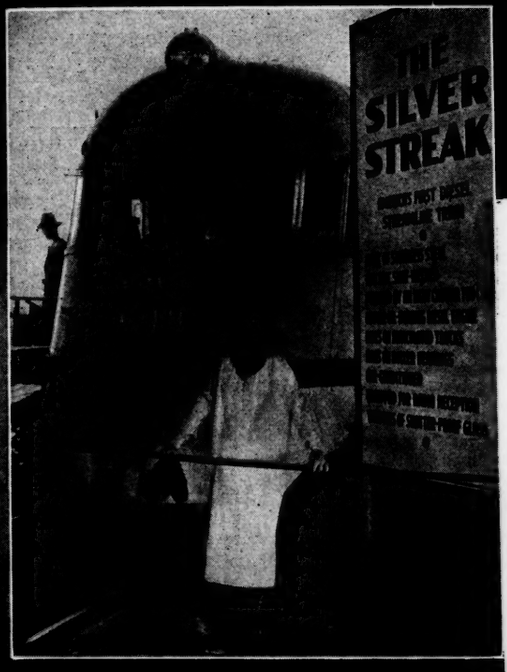
↑ A HOUSEBOAT ON LAND. In order to make room for more automobiles, the forward cabins of the Great Lakes Engineering Works' steamer "Britannia" were removed. C. E. Baisley, the shipping company's manager, made a house from the two-story deck quarters. Appropriately, the heating system is by Gar Wood.

PICTURE PARAGRAPHS

↖ A DEGREE-DAY METER. H. B. Yost, of the Hope Natural Gas Co., West Virginia, has invented a recording meter for degree-days. The box, mounted on the roof, has a heat loss per square foot similar to the average residence. The box is heated by a thermostatically-controlled electric unit which maintains the box at 70°. The watt-hour meter, conveniently located in the building, measures the current supplied to the box but is calibrated directly in degree-days. Since heat loss is measured, the meter includes the effect of the sun and wind as well as the outside temperature.



↑ HONEY DEAN, winsome NBC artist, sings in comfort despite the intense heat from the battery of lights. A single Westinghouse unit keeps the air cool in the studio.



← AIR CONDITIONING IS FEATURED on the signboard advertising the Burlington's new streamlined, Silver Streak. Anne Shirley, 16-year-old movie star, in the foreground.

MORE AIR CONDITIONED BABIES. Memorial Hospital, Houston, Texas, which recently celebrated its 27th anniversary, has an air conditioned nursery. The unit, to the ↓ left, is an Ilg Spot Kooler.

Bid Depositories for Contractors Established; Fitts Code Authority Secretary, Full Time

NEW YORK—Joseph C. Fitts, recently appointed executive secretary of the Code Authority for the Heating, Piping and Air Conditioning Contractors industry, has been granted a leave of absence from his position as secretary of the Heating, Piping and Air Conditioning Contractors National Association in order to devote his full time to code work.

S. Lewis Land, educational director of the association, has been appointed acting secretary of the association.

Divisional Code Authority headquarters have been established in Room 1401, 1250 Sixth Ave., New York.

Bid depositories for the Heating, Piping & Air Conditioning Contractors division of the construction industry have been established as follows:

OAKLAND, CAL.—Oakland Chamber of Commerce, Financial Center Building, Oakland, Cal. *Jurisdiction:* City of Oakland and Alameda County, Cal.

SAN FRANCISCO, CAL.—413—10th St., San Francisco, Cal. (Operated by Local Administrative Agency). *Jurisdiction:* City limits of San Francisco.

DENVER, COLO.—Colorado Construction League, 814—12th St., Denver, Colo. (In charge of William M. Fuller). *Jurisdiction:* Adams, Araphoe, Clear Creek. Denver, Gilpin, Douglas, Elbert and Jefferson Counties.

WATERBURY, CONN.—Waterbury Builders Exchange, 7 Field St., Waterbury, Conn. *Jurisdiction:* City of Waterbury.

DISTRICT OF COLUMBIA.—2539 Pennsylvania Ave., N.W., Washington, D. C. (In charge of W. Stecher). *Jurisdiction:* District of Columbia.

GEORGIA.—Domestic Engineers Club. W. R. Puckett, 5 Ivy Street Building, Atlanta, Ga. *Jurisdiction:* Entire State of Georgia.

CHICAGO, ILL.—Gray, Hunter, Stenn and Co., C.P.A., 35 East Wacker Drive, Chicago, Ill. *Jurisdiction:* City of Chicago and Cook County, Ill.

NEW ORLEANS, LA.—Room 405, 624 Gravier St., New Orleans, La. (Operated by Local Administrative Agency). *Jurisdiction:* City of New Orleans and New Orleans County, La.

BALTIMORE, MD.—Baltimore Building Congress, 1109 Fidelity Building, Baltimore, Md. *Jurisdiction:* City of Baltimore and Baltimore County, Md.

BOSTON, MASS.—Room 502, 77 Summer St., Boston, Mass. (In charge of Walter H. Oleson). *Jurisdiction:* Metropolitan Boston Area.

DETROIT, MICH.—Builders and Traders Exchange, 439 Penobscot Building, Detroit, Mich. *Jurisdiction:* City of Detroit and Macomb, Oakland, Washtenaw and Wayne Counties, Mich.

MINNEAPOLIS, MINN.—Builders Exchange, Inc., Minneapolis, Minn. *Jurisdiction:* City of Minneapolis and Hennepin, Anoka, Scott, Pine, Chisago, Kanabec. Insanti, Milaca, Sherburne, Benton, Wright, Morrison, Meeker, Stearns, Todd, Pope, Douglas, Otter Tail, Grant, Stevens, Big Stone, Traverse, Wilkin, Swift Kandijohi, Chippewa, LacQui Parle, Carver, McLeod, Renville, Yellow Medicine, Sibley, Redwood, Lyon and Lincoln Counties.

KANSAS CITY, MO.—Ernst & Ernst, accountants and auditors, Federal Reserve Bank Building, 10th and Grand Sts., Kansas City, Mo. *Jurisdiction:* City of Kansas City and Clay and Jackson Counties, Mo., and Johnson* and Wyandotte* Counties, Kansas*.

*Included in Kansas City, Mo., territory until committee in Kansas is formed.

ST. LOUIS, MO.—Missouri Insurance Building, 3908 Olive St., St. Louis, Mo. (Under supervision of Local Administrative Agency). *Jurisdiction:* City of St. Louis and St. Louis County, Mo.

ASBURY PARK, N. J.—Peter Cooper, Electric Building, Bangs Ave., Asbury Park, N. J. *Jurisdiction:* City of Asbury Park, Monmouth and Ocean Counties, N. J.

JERSEY CITY, N. J.—Trust Company of New Jersey, Peoples Safe Deposit Branch, 357 Central Ave., Jersey City, N. J. *Jurisdiction:* City of Jersey City and Hudson County, N. J.

NEWARK, N. J.—Federal Trust Co., 24 Commerce St., Newark, N. J. *Jurisdiction:* City of Newark and Essex County, N. J.

ALBANY, N. Y.—National Com. Bank and Trust Co., Trust Department, Albany, N. Y. *Jurisdiction:* City of Albany and Albany, Columbia, Greene, Rensselaer, Schenectady, Schoharie and Sarato Counties, N. Y.

BINGHAMTON, N. Y.—Marine Midland Trust Co., Binghamton, N. Y. (In charge of Earl Hardy). *Jurisdiction:* Broome, Chenango, Otsego and Tioga Counties. N. Y.

NEW YORK, N. Y.—1731 Grand Central Terminal, New York, N. Y. (Operated by Local Administrative Agency). *Jurisdiction:* Greater New York and all of Long Island, N. Y.

UTICA, N. Y.—Utica Chamber of Commerce, George Winslow, Secretary, Utica, N. Y. *Jurisdiction:* Fulton, Herkimer, Madison, Montgomery and Oneida Counties.

WHITE PLAINS, N. Y.—People's National Bank & Trust Co., 31 Mamaroneck Ave., White Plains, N. Y. *Jurisdiction:* Orange, Putnam, Rockland, and Westchester Counties, N. Y.

NORTH CAROLINA.—North Carolina Heating Bid Depository, 806 Capital Club Building, P. O. Box 889, Raleigh, N. C. (In charge of W. F. Morris). *Jurisdiction:* State of North Carolina.

CLEVELAND, OHIO.—Room 4012, 1227 Prospect Ave., Cleveland, Ohio. (Under supervision of Local Administrative Agency). *Jurisdiction:* Cuyahoga and Lake Counties, Ohio.

RHODE ISLAND.—Providence Chamber of Commerce, C. J. France, Market Square, Providence, R. I. *Jurisdiction:* Entire State of Rhode Island.

NASHVILLE, TENN.—Nashville Contractors Association, R. L. Farrar, secretary-manager, 311 Chamber of Commerce, Nashville, Tenn. *Jurisdiction:* City of Nashville and Cannon, Cheatham, Davidson, DeKalb, Dickson, Giles, Hickman, Houston, Humphries, Lawrence, Lewis, Macon, Marshall, Montgomery, Murray, Perry, Robertson, Rutherford, Smith, Stewart, Sumner, Trousdale, Wayne and Wilson Counties.

NORFOLK, VA.—Kutz and Fentress, Inc., realtors, 105 West City Hall Ave., Bankers Trust Building, Norfolk, Va. (In charge of William C. Kutz). *Jurisdiction:* City of Norfolk and Accomac, Northampton, Mathews, Gloucester, James City, York, Warwick, Elizabeth City, Princess Anne, Norfolk, Nasemond, Isle of Wight, Surrey, Sussex, Southampton and Greensville Counties, Va.

RICHMOND, VA.—6th and Franklin Sts., Room 110, 109 Builders Exchange Bldg. (In charge of R. H. Griffin, executive secretary). *Jurisdiction:* Cities of Richmond, Petersburg, Charlottesville, and Fredericksburg, Va.

SEATTLE, WASH.—Seaboard Branch, First National Bank of Seattle, Seattle, Wash. *Jurisdiction:* City of Seattle and King County, Wash.

MILWAUKEE, WIS.—Construction Industry Credit Bureau, Inc., 709 North 11th St., 323-335 Marquette Bldg., Milwaukee, Wis. (In charge of Edwin Zedler). *Jurisdiction:* Milwaukee, Washington, Waukesha, and Ozaukee Counties, Wis.

It is important to note that bidders must deposit their bids in the depository having jurisdiction over the territory in which the job is located.

Combine Manufacturing Facilities

DETROIT — A consolidation of manufacturing facilities of three concerns manufacturing refrigerators, commercial condensing units, and air conditioning equipment is announced by Dallas E. Winslow, president of Dallas E. Winslow, Inc., parent corporation of Copeland Refrigeration Corp., Mount Clemens, Mich., Trupar Manufacturing Co., Dayton, Ohio, and Zerozone Refrigeration Corp., Chicago.

The combined operations of these three units will be housed in the manufacturing plant located at Holden and Lincoln Aves. Detroit, formerly used by Lincoln Motor Car Company. This plant has a floor area of upwards of 200,000 sq. ft. with service from three main line railroads.

Ice Dealers Should Promote A. C., Says Brandt

SAN FRANCISCO — Emerson Brandt, secretary of the technical department, National Association of Ice Industries, gave a talk on the technical phases of refrigeration problems at the association's national convention in The Palace Hotel here in November.

"Then there is air conditioning. It's the baby of ice refrigeration, and its birth was heralded with great fanfare. We have recently developed ice comfort cooling in our homes. The ice man should be the first one to take advantage of this modern cooling system. If he doesn't, how can he expect to sell the idea to others. The equipment is ready and available for use," said Mr. Brandt.

Benson on Wentworth Staff

BOSTON—Henry W. Benson, formerly with the B. F. Sturtevant Company, General Electric Company, and more recently assistant to the consulting engineer for the East Boston traffic tunnel, has been appointed instructor in applied science at Wentworth Institute, Boston.

Boston Groups May Merge

BOSTON—A proposal for a merger of the Boston Oil Burner Associates and the Air Conditioning Bureau of Boston is under consideration by the membership of both organizations. With automatic heat now classed as a part of air conditioning, many members believe that the merger is a logical one.

WITH THE MANUFACTURERS • • •

HEXCEL RADIATOR COMPANY will move its plant about January 1 from Milwaukee to Racine, Wis., in a modern daylight building. John G. Zummach, mechanical engineer, joins the staff of this company as chief engineer, and is in complete charge of the commercial and air conditioning branch of the business. Mr. Zummach comes back to the same plant after a lapse of 13 years. He is again associated with Fred M. Opitz, who headed the original Perfex Radiator Company, and now is president and general manager of Hexcel.

FRIGIDAIRE CORPORATION has appointed R. F. Gray north central wholesale manager of the air conditioning and automatic heat division. Some eight years ago Mr. Gray was vice-president and sales manager of Domestic Engineering Co., Portland, Ore. Later he was district representative for Iron Fireman Manufacturing Company, and assistant regional director for Carrier Engineering Corporation.

BISHOP HUMIDIFIER CO., 8011 Dexter Blvd., Detroit, has been organized by Fred R. Bishop, who for the past year and a half has sold the output of the Universal Humidifier Company. Mr. Bishop has severed his connection with Universal. The new company has placed on the market a humidifier and automatic water pan filler.

THE AMERICAN ROLLING MILL CO., Middletown, Ohio, has opened a sales office at 1437 Citizens and Southern National Bank Building, Atlanta, Ga., with C. M. Broome, Jr., assistant district manager, in charge. This office will serve Florida, South Carolina, Alabama, Georgia, and parts of Tennessee and North Carolina, which territory was formerly covered by the Middletown district office.

COMBUSTION ENGINEERING CO., INC., New York, has added Lloyd R. Stowe, formerly manager of the stoker department of the Laclede-Christy Company, and later in a similar capacity with Johnson & Jennings of Cleveland, to its staff as district manager of the St. Louis territory. Mr. Stowe is well known to the power plant field as an authority on the burning of mid-west coals.

KELVINATOR CORPORATION, through V. C. Woodcox, its advertising director, announces the appointment of W. M. DeWitt to the management of the company's domestic advertising and sales promotion department.

Wilbur E. Saylor will be Mr. DeWitt's assistant. Since 1932 Mr. Saylor has been in the merchandising division of Kelvinator's sales promotion department, and prior to that spent five years in publicity and advertising work, specializing in refrigeration and air conditioning.

J. C. Chambers, newly appointed assistant general sales manager of Airtemp. He was formerly with Frigidaire

AIRTEMP, INC., has appointed the Weber Implement and Automobile Company its distributor in St. Louis. A showing of the air conditioning equipment was held by the Weber Company November 6. H. C. Jamerson, general sales manager of Airtemp, Inc., and J. C. Chambers, assistant general sales manager and director of engineering, attended. The Weber Company will serve as distributor for St. Louis, eastern Missouri, and southern Illinois.

REYNOLDS METALS CO., New York, has appointed J. L. Blackshaw, formerly of the research laboratory staff of the A.S.H.V.E., to the Building Products Division of the company, with headquarters in New York. Mr. Blackshaw will have complete charge of all heating, ventilating, and related technical problems in connection with the company's metal foil insulation, tests and calculations, and will pass on all advertising claims. He will also train the sales force on heating, air conditioning, and ventilating problems as they apply to insulation.

J. L. Blackshaw, Reynolds Metals Co.

MOTORSTOKER CORPORATION, New York, announces the following additions and changes in its organization: The directorate now consists of Walter Barnum, president; D. M. Armstead, Spruille Braden, H. M. Brooks, W. T. Gardiner, E. L. Green, D. M. Parker, G. H. Townsend. W. G. Triest has joined the organization as executive vice-president, H. J. Wilson is vice-president and general manager, and Phillip Clover is general sales manager. H. L. Siegmund is general manager of field engineering and service, C. B. Graves is assistant general sales manager and A. H. Messing, president of Peck Advertising Agency, Inc., has been appointed merchandising and advertising counsel.

REPUBLIC STEEL CORP., Youngstown, Ohio, has appointed Robert J. Working district sales manager in Cincinnati, succeeding W. A. Peck as head of the Cincinnati office. Formerly in the sales department of United Alloy Steel Corporation at Canton, Ohio, Mr. Working was placed in charge of the Cincinnati district office of the Central Alloy Steel Corporation in 1927. Following the Republic merger in 1930 he was made assistant district sales manager of the Cincinnati office.

KELVINATOR CORP., Detroit, has appointed George N. Brown, for the past three years manager of the electric refrigeration bureau, Edison Electric Institute, special utilities sales representative. Mr. Brown will make his headquarters in New York, and will contact power companies.

AMERICAN SHEET AND TIN PLATE CO., Frick Building, Pittsburgh, announces that Walter A. Bowe has joined its general offices sales organization. Mr. Bowe recently resigned as advertising manager of the air conditioning department of General Electric Company.

Perfection Stove Gets Boston Outlet

BOSTON—Superair Conditioning Corporation of Boston has been formed to handle exclusively the Superfex conditioner, product of the Perfection Stove Co., Cleveland. James Maratta is president and Thomas S. Barbrick is vice-president and sales manager. W. Irving Monroe, Jr., is treasurer.

Coal Costs Cut in Camden

CAMDEN, N. J.—Acting on the complaint of coal dealers here, the Interstate Commerce Commission issued an order November 1 reducing the rates on anthracite coal from Pennsylvania mines to Camden and its suburbs. The reduction ranges from 20 to 30 cents per ton and places Camden on the same rate basis as Philadelphia.

Glass Stops Heat, Passes All Light Rays

NEW YORK—Glass experts have now produced glass which absorbs most of the heat rays in sunlight, yet passes almost all the visible part of the sun's spectrum. The new glass will be useful in skylights and windows in industrial plants of the south during the hottest months of the year. In addition, it will be useful in air conditioning, since it has a low heat transmission coefficient.

The characteristics of the heat-absorbing glass were described at the recent meeting of the Optical Society of America. Solar energy, it was explained, as it seeps through the atmosphere of the earth, has only about one-third of its rays in the visible region of the spectrum. The rest of the sunlight consists of the invisible ultra-violet light on one side and the unseen, infra red, or heat on the other.

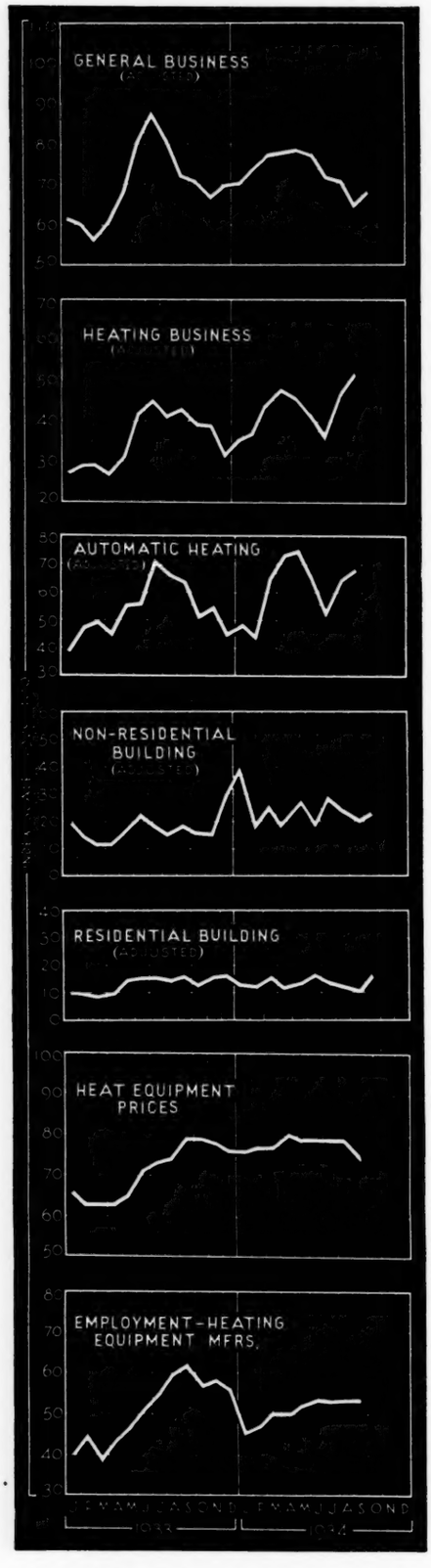
The heat-absorbing glass cuts down the heat ray portion of the spectrum. Small amounts of iron in the glass act as heat catchers. Some types of glass will stop and absorb about 52% of the heat rays. Another 8% is reflected off the surface of the glass. The remainder consists of the visible rays.

While the heat that is absorbed by the glass must be re-radiated, much of it is carried away by the proper design of ventilation around the window or skylight. What remains after this process is radiated, half to the inside and half to the outside. The part coming into the room is spread out in all directions. A person sitting in a beam of sunlight in the room feels little if any heat from the beam.

Dealers Exhibit at Grange Show

HARTFORD, CONN.—Several dealers in heating equipment and materials staged exhibits at the Connecticut State Grange Exposition, held at the State Armory here November 12-17 in connection with the National Grange Convention. Rodasy Products Company showed the Motorstokor automatic coal heating line; Sage, Allen & Company, Inc., Quiet May furnace oil burners; Super Oil Heator Sales Company, Silent Glow and Super oil burners, and Southern New England Insulation Company, Capitol rock wool insulating material.

BUSINESS TRENDS



Above charts marked "adjusted" are those in which corrections have been made for seasonal variation. The second chart is that of HEATING AND VENTILATING'S Index of Heating Business Activity, the third our Index of Automatic Heating. New building figures are from F. W. Dodge Corp. Indexes of employment and prices are based on data of the Bureau of Labor Statistics, U. S. Dept. of Labor.

New York Set for Power Show

NEW YORK—The 11th National Exposition of Power and Mechanical Engineering takes place December 3-8 at Grand Central Palace here. Thus the Power Show—to call it by its most familiar name—will be held during the same week and in the same city as the national mid-winter, annual meeting of the American Society of Mechanical Engineers.

Improved heating and air conditioning, representing a field of increasing industrial interest, will be the subject of numerous exhibits at this year's Power Show. The range of air conditioning and heating exhibits is being designed to interest those responsible for the heating or air conditioning of hotels, restaurants, factories, stores, offices and churches. In the same department of the Exposition there will be direct-connected blowers with remote variable air control feature, spot coolers, humidity control systems, cooling towers, and dust separators. The fields which some of these exhibits will interest most valuably include power plant, mining, gas conditioning, chemical and central station.

In addition to the heating, ventilating, and air conditioning manufacturers listed in last month's issue as exhibitors, the following will have booths at the show: L. J. Wing Mfg. Co.; Fitzgibbons Boiler Co., Inc.; General Electric Co.; D. G. C. Trap & Valve Co., Inc.; McDonnell & Miller; The Fairbanks Co., and Dole Valve Co.

1000 FHA Inquiries per Day for Johns-Manville

NEW YORK — Johns-Manville is now receiving inquiries on FHA loans at the rate of more than 1000 a day. A surprisingly large percentage of these requests are resulting in sales, causing the company to believe that participation in the housing act will be nationwide and that hopes of the Durable Goods Industry Code committee will be realized.

Chicago Has Two A.C. Churches

CHICAGO — This city is believed to have the only two air conditioned churches in existence. Our Lady of Grace church, now under construction, has been designed for complete conditioning. The system has three 20-hp. freon compressor units and a 5-hp. blower.

The First Chicago Methodist Episcopal church, located in the Chicago Temple Building installed air conditioning in 1927 a few years after the structure was built. The main equipment consists of a 65 ton CO_2 compressor connected to a 90 hp. motor.

Modernized Mansion Now Apartment, Has A. C.

BOSTON—New England will soon see its first air conditioned apartment building, combined with oil heat and complete modernization. This is an old brick family mansion at 406 Beacon Street, occupied for a time as a fraternity house, but more recently vacant. It is now in the process of conversion into one and two-room apartments, including the former ground floor basement, and the fourth, or top floor, which was formerly devoted to maids' rooms and entirely without heat.

The system of heating and air conditioning is split, so that in part—the bathrooms and dinettes — there are convectors. Another part utilizes the old warm-air registers in the floors, while for the top floor the conditioned air is distributed through registers in the ceilings.

A Hart oil burner is used. The air is washed, filtered, humidified, circulated, and recirculated with five changes per hour in all the suites. Provision has also been made to add equipment for ice-cooled air in summer.

The engineer in charge of the design was F. A. Alden.

Canadian Group Meets

TORONTO ONT.—A feature of the November meeting of the Ontario chapter, A.S.H.V.E., held in the Royal York Hotel, was an address by J. S. Keenan, assistant to the manager, merchandising department, Canadian General Electric Company, Ltd. Mr. Keenan chose as his subject "It Costs Less to be Modern" and showed that it is good business to keep down overhead costs by the use of the latest equipment.

E. Holt Gurney gave a verbal report of the recent meeting of the society council, of which he is the Canadian member, and urged the members of the Ontario chapter to attend the semi-annual meeting of the society in June, at French Lick, Ind.

Thirty-five members and guests attended.

N. J. Drops Retail Coal Authority

NEWARK — The New Jersey Retail Coal Code Authority has disbanded its staff and will close its main offices in the Industrial Office Building, Newark, and 15 branch offices throughout the state. The 15 employes were dropped as of November 1.

There has been a breakdown all along the line in the state recovery administration, but the Coal Authority is the first to give up the pretense of maintaining an administrative structure. Failure of price-fixing and general dissatisfaction with state recovery methods have brought about disintegration of all the code efforts.

The coal code has covered about 1,500 retail coal dealers and about 1,500 truckers, peddlers and the like.

About $100,000 was put into the recovery administration by coal dealers.

Pullman to Have 25% of its Cars A.C. by 1935

CHICAGO—From present indications, the number of air conditioned railway cars operated by Pullman Company at the beginning of the 1935 summer season will be 2,200 or more, which would be well over 40% of the 4,944-average of cars in active service in 1933, over 25% of the 8,478 cars owned the first of this year, and come close to doubling the present number of air conditioned cars operated by Pullman.

Currently the company has over 1,200 cars air conditioned, the greater number of which are in use on eastern roads.

A. C. Engineer Addresses New York Group

NEW YORK—A. Warren Canney, air conditioning engineer on the staff of Clyde R. Place, consulting engineers, spoke on air conditioning at the regular monthly meeting of the New York chapter of the American Society of Heating and Ventilating Engineers, November 19.

In pointing out the reasons for using air conditioning, Mr. Canney said that many building owners lost sight of the detailed and not so highly publicized advantages which he listed. Included were the following:

1—Annual redecorating costs are reduced considerably.

2—Routine cleaning costs become lessened appreciably.

3—By eliminating the sudden expansion and contraction stresses set up by fluctuating differentials between indoor and outdoor surface temperatures, the longevity of an air conditioned structure is prolonged.

4—The cracking of plaster, except from water, becomes passé.

5—$10 to $20 per year per employe is saved due to the reduction of absentees from minor illnesses, dependent on average salary.

6—All hygroscopic materials are of course preserved, such as leather, paper, and particularly woodwork, glued joints, and finishes.

7—For the first time in modern history street noises can be kept out of the building during all seasons of the year.

8—Office materials and desks as well as the individuals occupying air conditioned buildings stay fresher, cleaner throughout the day.

9—The lost time fussing about the regulation of comfort by one means or another, the bickering over how much the windows should or shouldn't be opened becomes relegated to the days of old.

10—People have more energy during all seasons, do more, make fewer costly mistakes. They are happier and more cordial on both sides of the counter, which promotes sales otherwise needlessly lost.

11—The increase in patronage and profits through the application of air conditioning to many specific businesses is getting to be a matter of common knowledge.

12—Air conditioning results in a marked decrease of heating costs by producing a lower average temperature, thus reducing the differential between outside and inside; in preventing waste heat above the breathing line; in avoiding widely fluctuating temperatures; by effecting a tremendous saving by the reduction of cold air leakage inward through open windows and loss of indoor air to outside (the largest cost of waste heat in most buildings); in effecting efficient heat transfer, and in reducing or eliminating a loss of radiant heat to cold window surfaces.

13—Interior space is not only made useable, but put on practically the same plane of value as space along the outside walls.

14—Air conditioning makes for the leasing of deep spaces.

15—Proper air conditioning keeps out fumes and odors from the street or from neighboring buildings, or from adjacent spaces.

16—In keeping the ground and second floor windows locked the possibility of ordinary thieving is practically eliminated. In its residential application air conditioning has a possibility of reducing indoor kidnapping, more effectually than all the laws in the country.

17—Stocked goods of all kinds do not spoil nor deteriorate where dirt is a factor.

18—The operating costs chargeable to ventilation are absorbed, and accordingly written off on a change-over.

The second part of his talk was devoted to the air conditioning of Rockefeller Center, with particular stress on the condition of the Music Hall.

Mr. Canney mentioned that the design of an air conditioning system for a commercial building differed from that of an industrial plant or a theater in that the system had to be flexible enough so that a given space could be properly conditioned regardless of the type of tenant. One tenant using a certain space might require as much as 20 times the air conditioning load as another tenant in the same space a year later.

Canada Briefs

GUELPH, ONT.—G. Alex. Forbes was recently elected president of the Taylor-Forbes Company, maker of hot water heating boilers. Craig Evans was appointed vice-president in addition to his duties as managing director.

TORONTO, ONT.—The Canadian Sirocco Co., Ltd., Windsor, has opened a direct factory branch at 57 Bloor Street, West. H. R. Roth is manager of the new office.

Coke Stokers Sold in Chicago

CHICAGO—Forty-eight coke stokers were installed up to November 10 by the Vodoz Coke-Stoker Corporation which began operation in August here. The stoker is handled through the Interlake Iron Corporation, coke manufacturer, which supplies the device to its various retail dealers.

The stoker is of the domestic overfeed type and will take care of boilers up to 30-in. firepot. The total cost, including installation, is $119.50.

West Coast A. C. Society Meets

SAN FRANCISCO—H. T. Holbrook, Union Ice Company, spoke on Sales Promotion Methods for Ice Air Conditioning at the November meeting of the Air Conditioning Society of San Francisco.

It was decided to hold the semi-annual meeting December 13, to which heating and piping contractors will be invited.

Members of the society make a practice of visiting outstanding installations of air conditioning equipment in various establishments in and near this city. Their last visit took them to the new San Francisco county jail where Sheriff Fitzgerald took them on a personal inspection of the air conditioning equipment of this institution.

The society is proud of its directory of members which has just been published and which contains names of members, companies represented, address and telephone number, and equipment handled.

SAN FRANCISCO—The regular monthly luncheon meeting of the Air Conditioning Society was held at Marguard's Cafe on November 8. It was featured by an interesting talk on asbestos and insulation in modern air conditioning. The speaker told of the discovery of asbestos and how for centuries it was regarded as a curiosity. He dwelt at length on the many uses found for this mineral these days.

President G. W. Nunn announced a steady increase in membership and introduced the new members.

An Office Idle

At three o'clock I felt fatigue;
My eyes grew hot and dry;
Dictation failed quite to intrigue,
For sleep and stupor seemed in league;
We loafed, my boss and I.

We knew not where the trouble lay,
But help was swift and near:
An air conditioner said, "Say,
I've come to make your air O.K.,
You've Ariditis here!"

It gave us, ere it was too late,
Good living air—you see—
It saved us from a dreadful fate,
For folks grow dull and desiccate,
With no humidity!

E. C. Goss

Kendall Sells Interests

BOSTON—George H. Kendall, mechanical engineer of Boston and Weston, has sold his half interest in Lord-Kendall Patent Development and Lord-Kendall Laboratories, Inc., to New York and Philadelphia interests. This company manufactures the Lord-Kendall air conditioner.

Mr. Kendall will continue his office in Weston handling problems for manufacturers on development of new air conditioning products particularly fitted for home use, as well as special machinery.

Correction

Advice has reached us that due to changes recently made, details of which are not yet available, the information concerning the air conditioning for the Monroe-Dearborn Building, Chicago, as published in our November issue, is not now entirely correct.

COMING EVENTS

DECEMBER 3-7, 1934. *Fifty-fifth Annual Meeting of the American Society of Mechanical Engineers, New York, N. Y.*

DECEMBER 3-8, 1934. *Eleventh National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.*

DECEMBER 5-6, 1934. *December Convention of the National Warm Air Heating and Air Conditioning Association, William Penn Hotel, Pittsburgh, Pa.*

DECEMBER 5-7, 1934. *Thirtieth Annual Meeting of the American Society of Refrigerating Engineers, Hotel New Yorker, New York.*

JANUARY 28-30, 1935. *Forty-First Annual Meeting of American Society of Heating and Ventilating Engineers, Hotel Statler, Buffalo, N. Y.*

JUNE, 1935. *Annual Convention of the National District Heating Association, Philadelphia, Pa.*

Taunton Municipal Plant Supplies District Steam

TAUNTON, MASS.—A two-year program which was started in the early part of 1933 is being completed by the Taunton municipal lighting plant, which provides for production of both electricity and commercial steam service. At the present time some 14 manufacturing plants have been connected with the underground steam service, and others will follow, while plans have been made for eventual extension of the steam service to other parts of the city, including the intown retail district.

The program involved installation of a modern steam and electrical generating plant, with construction of a mile and a half of underground mains for the steam service.

Arthur L. Nelson, engineer, Boston and New York, was in charge of the work, having been consulting engineer for the Taunton plant for the past 15 years. The underground mains were laid by the Underground Steam Construction Co., Boston.

Total steam capacity of the plant is 250,000 lb. per hr., of which a large part is available for commercial distribution. Industries served include stove, silverware, pewter, jewelry, textile, oil cloth and rubber goods manufacturers.

Hydrocal Explained to Detroit Group

DETROIT — The Hydrocal, an instrument for measuring heat flow, developed by the staff of the University of Michigan, was described to the members of the Detroit section, American Society of Refrigerating Engineers, at a meeting November 12, by Prof. A. D. Moore, of the engineering department of the university.

The Hydrocal consists of a series of 12 vertical tubes containing methylene blue, the tubes being connected by means of rubber hose with clips for controlling the flow of the liquid from tube to tube. In operation, the height of the liquid in the tubes indicates the temperature, and the flow from tube to tube indicates the heat flow of the material being studied. The requisite pressure is obtained by immersing the series of tubes in a tank to a sufficient depth to duplicate the pressure desired.

The speaker asserted that this instrument can be used to advantage to solve many of the problems in heat flow and is much faster than mathematical calculations, stating that a given program in heat flow that required an hour and one half to calculate mathematically was solved more accurately by the Hydrocal in a few minutes.

Cincinnati Group Holds Luncheon Meetings

CINCINNATI—The Cincinnati chapter, A.S.H.V.E., is now holding Wednesday luncheons in the rathskeller of the Hotel Gibson every week. At the meetings various local problems are discussed, such as the future effects of the codes, as they may be expected to affect heating and ventilating in this territory.

It was planned to start the regular monthly meetings the second Tuesday in November. The chapter missed its ordinary opening meeting of the winter season which usually takes place on the second Tuesday in October, but expect to make up for it with the weekly luncheons and the intensive programs for the remainder of the winter season.

Harrisburg Tavern Gets A.C.

HARRISBURG—An air conditioning system is being installed in the new Harris Ferry Tavern, formerly the Penn-Harris Hotel coffee shop, which the hotel has remodeled into a replica of the once-famous Harris Ferry Tavern.

The Elkwood Co., New Cumberland, Pa., is making the installation.

The Harris Ferry Tavern will be the second restaurant in this city to install an air conditioning system. The Alva, for some time apparently the most popular restaurant here, has credited its air conditioning system as being responsible for its increased business.

Southern Pacific to A.C. 260 Cars

SAN FRANCISCO—Plans for air conditioning of all passenger equipment used in limited trains operating over its four transcontinental routes, as well as a large part of the equipment carried on its principal trains operating on the Pacific Coast and Mexico, were announced recently by the Southern Pacific Company. The program calls for an expenditure of about $2,000,000.

Work will be started immediately on 260 cars, and the expense will be borne by both the Southern Pacific and the Pullman Company. This equipment will be ready for service May 1. Fifty-five of the cars will be air conditioned at the Southern Pacific shops in Sacramento, at a cost of about $450,000.

CHICAGO—The Northern Pacific Railway will spend nearly $1 million between now and May 1 for 24 lightweight de luxe coaches of high strength alloy steel and equipped with conditioned air. It also was understood that the Great Northern is planning complete air conditioning of its empire builder trains.

New Burner Rules in Manitoba

WINNIPEG, MAN.—The Minister of Public Works in the Manitoba government has announced the completion of a final draft of a safety code for the installation and operation of oil burners. The code will make compulsory a $50 license fee for companies dealing in fuel oil and a $2,000 bond to be filed with the minister of public works to guarantee compliance with government regulations.

The flash point of 110° F., is fixed as the minimum standard of oil used for fuel purposes. Meters and other equipment used to make the tests must be in charge of fully qualified men who are trained in the work. To ensure the proper installation of oil burners, after January 1, 1935, persons installing or servicing burners must show proper qualifications in addition to the payment of a license fee of $5.

A.C.E. Has Successful Meeting

CHICAGO — About 300 attended the November 21 meeting of the Air Conditioning Engineers which was featured by lectures by a number of speakers. F. P. Hutinson, Harrington & King Perforating Company, spoke on the artistic and decorative features of registers and grilles. Edward Blaker, Himelbau, Byfield Company, talked on air distribution from the standpoint of new developments, while J. H. Van Alsburg, Hart & Cooley Mfg. Company, related the history of grilles and diffusers.

The meeting was opened with two five-minute talks by members who spoke on "Air Conditioning and Health" and "Air Distribution."

The next meeting will be held December 13 at the Light Institute, Civic Opera Building.

Morris D. Robinson

PHILADELPHIA, PA.—Morris D. Robinson, general manager in the Phi'adelphia district for Crane Company for over 30 years, died November 1 at his home, 6804 Lawton Ave., Oak Lane, Philadelphia. Death resulted from a heart attack. Mr. Robinson, who was 63 years of age, was born in Louisville, Ky., and later removed to Chicago where he became connected with the Crane Company about 1902, remaining with them until his death. He was a director of the Trenton Potteries, President of the Tri-State Plumbing & Heating Supply Wholesalers' Association, and a member of the Bankers' Club, Manufacturers' Club, and the Old York Road Country Club.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF MARCH 3, 1933 OF HEATING AND VENTILATING, published monthly at New York, N. Y., for October 1, 1934.

State of New York, County of New York, ss.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Edgar A. Becker, who, having been duly sworn according to law, deposes and says that he is the Treasurer of The Industrial Press, publishers of Heating and Ventilating and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The Industrial Press, 140-148 Lafayette St., New York, N. Y.

Editor, C. H. B. Hotchkiss, 140-148 Lafayette St., New York, N. Y.

Managing Editor, Clifford Strock, 140-148 Lafayette St., New York, N. Y.

Business Managers, Robert B. Luchars, 140-148 Lafayette St., New York, N. Y.; Edgar A. Becker, 140-148 Lafayette St., New York, N. Y.; Erik Oberg, 140-148 Lafayette St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

The Industrial Press, 140-148 Lafayette St., New York, N. Y.; Estate of Alexander Luchars, 140-148 Lafayette St., New York, N. Y.; Louis Pelletier, 140-148 Lafayette St., New York, N. Y.; Erik Oberg, 140-148 Lafayette St., New York, N. Y.; Robert B. Luchars, 140-148 Lafayette St., New York, N. Y.; Edgar A. Becker, 140-148 Lafayette St., New York, N. Y.; Laura A. Brownell, 140-148 Lafayette St., New York, N. Y.; Franklin D. Jones, 140-148 Lafayette St., New York, N. Y.; Elizabeth Y. Urban, 163 Western Drive, Longmeadow, Mass.; Helen L. Ketchum, Atlantic Ave., Cohasset, Mass.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner: and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

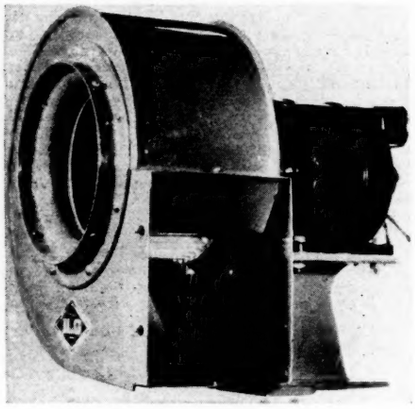
EDGAR A. BECKER, Treasurer

Sworn to and subscribed before me this 28th day of September, 1934.

CHARLES P. ABEL

Notary Public
Kings County No. 319
Kings Register No. 5120
N. Y. County No. 207
N. Y. Register No. 5-A-128
My Commission Expires
March 30, 1935.

NEW EQUIPMENT



Ilg low-pressure blower

Ilg Low-Pressure Blower

Ilg Electric Ventilating Co., 2850 North Crawford Ave., Chicago, is offering a line of blowers in five sizes and designated the Type B volume blower. Available in different speeds, free air capacities range from 180 c.f.m. to 2100 c.f.m. and pressure ranges to 1½ in. static pressure.

The steel housing is press-formed and mounted in a cast-iron base. Inlet flange is cast iron. The multiblade wheel is die cut and mounted directly on the shaft of the motor which is placed on the cast-iron base. The wheel is dynamically balanced.

Motors can be supplied for any of the common commercial voltages, a.c. or d.c., single or three phase.

Fairbanks Globe and Angle Valves

A new line of renewable bronze, angle, and globe valves is being placed on the market by The Fairbanks Co., 393 Lafayette St., New York.

Some of the features claimed for these valves are:

The radial seat, between body and bonnet, gives a tight joint and alignment of all parts, which decrease wear. The disc ring serves in the control of steam and also on hot and cold water. It is composed of long-fibre asbestos, compounded with vulcanizing elements and cured.

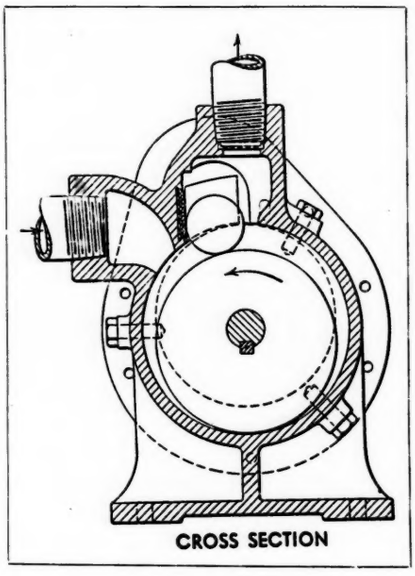
The disc holder is of standard dimensions, permitting the use of other standard makes of disc rings if desired. Stem is of rolled rod bronze, averaging 65,000 lb. tensile strength. At least five Acme threads are at all times in contact with the bonnet.

The union nut is of heavy bronze with large hexes. A protected top seat above the threads on stem assures a clean, tight joint when the valve is fully opened for repacking.

Anderson Rotary Pump

Anderson Rotary Pump Co., 120 Liberty St., New York, has developed a positive displacement rotary pump which is claimed to reduce all sliding and grinding movements of the rotor and cylinder and substitute a rolling movement.

The displacement mechanism consists of a rotor keyed to a shaft and a free-rolling roller on top of the rotor. The rotor is rotated concentrically on a shaft and is provided at the high point with an extended cut-off surface which closes the two ports at the completion of each discharge. At no time is there any rub between the rotor and the cylinder.



Section, Anderson pump

The pump is designed to operate on non-lubricant liquids up to 100-lb. pressure. The recommended speed is from 275 to 300 r.p.m., but higher speeds may be used under certain conditions.

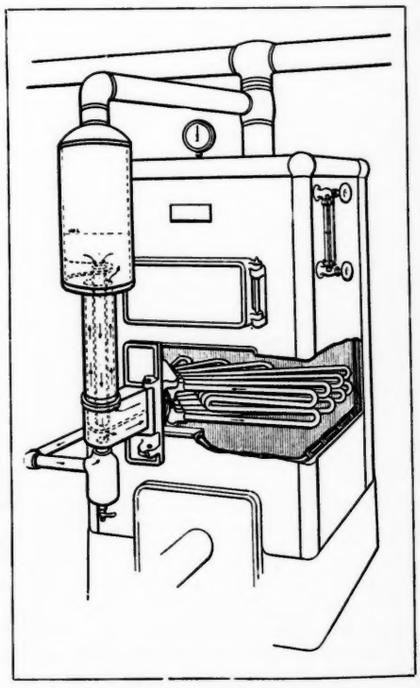
Savotherm

New Jersey Stoker Corp., 1246 Broad St., Newark, N. J., has introduced the Savotherm, a supplementary flash boiler for installation within the fire chamber of boilers. It consists of a header, made in two sizes to take either seven or ten tubes and which are made in a large variety of lengths so that by the right selection of header and tubes, any boiler can be fitted. The header is placed to the left side of the firedoor and as high as possible. The tubes are attached to the header and fanned out so that they completely cover the top of the fire chamber.

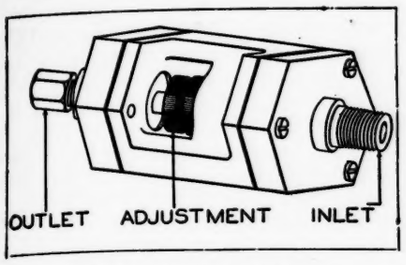
The lower part of the header is connected externally with the lower part of the boiler or return line from which it gets its feed. The upper part of the header is connected directly to the mains. On a steam job, a steam separator is provided which is placed at the water line and connected to the header by a nipple of the desired length. Inside this nipple a return pipe suspended from the separator leads the surplus 212° water back to the lower compartment of the header to circulate over the fire again. This circulating system within the Savotherm and independent of the boiler is said to furnish steam in large volume in 15 sec.

The steam produced is not turned into the boiler, but is injected directly into the mains in any location desired.

Where the oil burner is used during the summer to provide service water with an indirect heater, a special valve and connection is made from the return circuit of the Savotherm so that the water rising from the tubes to the steam separator is not returned to the header to be converted into steam, but is diverted to the indirect heater circuit, heating the service water, and at the same time preventing the generation of steam at a season when it is not needed.



Savotherm, showing hook-up



Water pressure governor

Monmouth Water Pressure Governor

A water pressure governor for use in humidifying systems is announced by The Monmouth Products Co., 226 East 131st St., Cleveland. This governor, measuring 1¼ in. x 2 in., assures delivery of water to air washers or humidifying pans at uniform pressure and hence at uniform flow, regardless of pressure fluctuations upon the inlet side.

The delivery pressure of the water can be set so low that much larger orifices or much larger needle valve openings can be employed. Other products of interest to the heating trades to be shortly announced include water filters and electrically-controlled water valves especially designed for use in humidifying systems.

May-Day Economizer and Humidifier

Minneapolis Air Conditioner Co., 1609 Hennepin Ave., Minneapolis, Minn., is marketing the May-Day humidifier and economizer. The device is placed between the boiler and flue, the heat being derived from the flue gases. Cold air returned from the room above supplies the unit with cool dry air which is heated and humidified in the unit, the water being supplied from a spray nozzle located in the top.

The device is especially designed for use where there are high stack temperatures. The outside walls are constructed of 24-gauge galvanized steel, the flue compartment of 16-gauge metal. The steel legs are adjustable. The unit measures 15 in. wide, 28 in. deep, and 48 in. high.

Century 8-Speed Motor

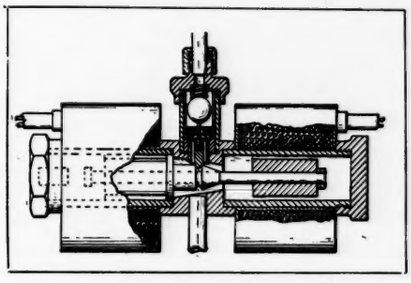
Century Electric Co., 1806 Pine St., St. Louis, has placed on the market a new eight-speed gear motor, with a four-speed motor and a two-speed gear. Two, four, and six-speed gear motors are also available. The motor may be wound for either single, two, or three-phase power while the gears are of the helical-cut type. The speed of the gear is changed by a lever.

Ice Cooling Appliance Corp. Ice Cooler

Ice Cooling Appliance Corp., Morrison, Ill., has announced an ice room cooling unit, for independent installation or use in connection with present heating facilities.

The cooler is made in two sizes for light loads, one with a capacity of 200 lb. of ice, 19 in. wide, 33 in. deep, and 30 in. high. The other has a capacity of 300 lb. of ice and is 19 x 44 x 30 in. Both models are finished in furniture brown with chrome trim and equipped with a 1/20-hp. electric motor, multivane blower, and large rubber-tired swivel casters.

A third model is for use in stores and offices. It provides 1 1/2-ton refrigerating capacity, and holds 1,200 lb. of ice. The dimensions of this cooler are 4 x 6 x 3 ft. It is finished in two-tone gray or dark green, and is equipped with a 1/4-hp. electric motor and multivane blower, and has 2 in. of rigid insulation.



Section, Hoppe CO_2 valve

High-Pressure CO_2 Valve

A new packless type electrically-operated valve designed especially for carbon dioxide has been announced by A. F. Hoppe Engineering Inc., 246 South Meridian St., Indianapolis. The valve can be used for pressures up to 1500 lb. per sq. in. and is of the quick opening and closing type. Current is used only when the valve is being opened or closed.

The valve has two plungers on a sliding shaft. When one coil is energized, the plunger will slide on the shaft until it strikes the shoulder and drives the shaft in the same direction. This in turn lifts the plunger which rides on the shaft and opens the ball valve.

Burnham Bellows Vacuum Valves

Burnham Boiler Corporation, Irvington, N. Y., is marketing a line of bellows vacuum valves. One model is a radiator and valve with a ⅛-in. side outlet, the other a quick-vent vacuum valve with ¾-in. male and ⅜-in. female threads for mains, risers, and convector radiators.

Russell Multi-Purpose Limit Switch

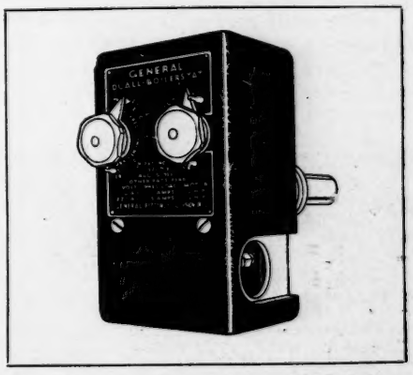
Russell Electric Co., 346 West Huron St., Chicago, has announced a new limit switch, rated at 15 amperes, 110 volts, a.c. This control may be used for either line or low voltage applications, is of the clamp-on type, and has quick make-and-break action controlled by a cobalt steel magnet.

As a hot water limit control for heating plant use, the switch is clamped to the main riser above the boiler. For the direct control of warm-air furnace fans, the switch is clamped to the bonnet of the furnace between the warm-air pipes. It will operate the fan only when there is heat in the bonnet. As a unit heater control the switch is clamped to the side of a unit heater so that the fan will not operate unless there is heat in the unit.

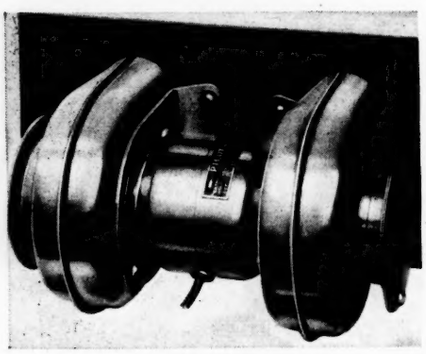
The switch is of small, compact design and has a differential of 20° with adjustable range of 100° to 200°. It is a 3-wire device, so that by selecting the proper pair of terminals it may be used either as a limit switch to open the circuit on a rise in temperature or it may be used as a control switch to close the circuit on a rise in temperature.

General Duall-Boilerstat

General Fittings Co., 100 Baker St., Providence, R. I., is marketing the General Duall-Boilerstat, a single instrument that controls the boiler for house heating and domestic hot water or steam, water, vapor, or vacuum systems. The instrument is said to take the place of the ordinary limit controls such as the pressurestat and aquastat used with a steam heating and domestic hot water system. It is designed to be located on the boiler 1 in. below the water line in a steam or vapor system. In a hot water system it should be installed either at tem it should be installed either at the side or the top of the boiler. The device is compact and neat in appearance.



Duall-Boilerstat



Twin blower unit

Pilot Blowers for Mechanical Draft

F. A. Smith Mfg. Co., Inc., 187 North Water St., Rochester, N. Y., is merchandising two models of direct-driven small blowers for use in burning small sized coal in heating plants.

The Model 1040 Pilot unit is for heaters measuring 23 in. and less, and delivers 50 c.f.m. A larger model, the 2040 Pilot twin unit consists of two blowers with a motor mounted between, and furnishes 100 c.f.m. The small unit consumes from 30 to 35 watts, the twin unit 60 watts. The motor is of the shaded pole, noiseless induction type for operating on 110 volts, 60 cycle, alternating current.

Detroit Differential Thermostat

A differential thermostat for cooling and air conditioning is being marketed by the Detroit Lubricator Co., Detroit, designated as No. 691. It is designed primarily for temperature control with room cooling apparatus during the summer. It automatically provides inside temperature control in accordance with the comfort curve. For example, when the outside temperature is 95°, it maintains the cooling unit with an air outlet of 80°, and thus controls according to the difference in temperature between the inside and outside.

It operates on the principle of two vapor charged thermal elements opposed to each other—one actuated by room temperature and the other by outside temperature. Quick make and break is secured by means of permanent magnets, which prevents "fluttering" at contacts.

Automatic Products Water Control Valve

Automatic Products Co., Milwaukee, Wis., has developed the Model 66 water control valve for use in connection with air conditioning and refrigeration and in industrial fields. The valve is also used for an air valve.

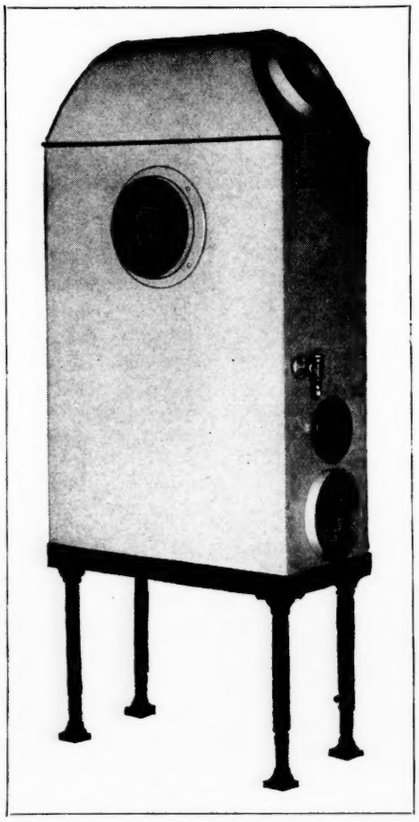
The valve is based upon the by-pass principle for opening the main valve seat. The water enters the inlet against the main valve seat and the bypass solenoid valve. When the solenoid coil is energized, it raises the bypass plunger. This plunger is not attached directly to the bypass valve stem, but travels a short distance and gains momentum before it raises the valve stem itself. This is known as an impact type plunger and accounts for the fact that the valve will open easily and efficiently under high pressure.

When the bypass valve is opened it allows the water to force the diaphragm down immediately, which in turn opens the main valve seat, allowing the full capacity of the water to pass through. As soon as the solenoid is de-energized, the bypass is closed. Since the main valve is opened against a spring, it returns to the closed position. The water above the diaphragm passes through a small port in the diaphragm.

The valve construction is of brass and non-ferrous material. The plunger is made of stainless steel, the strainer of monel metal, and the valve seats of special rubber composition.

Sanidaire Heat-Saving Humidifier

The Sanidaire heat-saving humidifier has been introduced by the United States Air Conditioning Corp., Minneapolis, Minn. The device is intended for use with oil burner installations where high stack temperatures are encountered.



Sanidaire humidifying economizer

The unit is placed between the heating plant and the chimney so that the flue gases pass through the center compartment of the humidifier. The flue gases pass down around a center baffle plate and into the flue. Surrounding the central compartment is an outer shell which receives cool air through the cold air return from the rooms above. This air is introduced into the humidifier at the bottom and absorbs heat rapidly from the surfaces of the center compartment.

A spray nozzle at the top of the unit throws a fine mist down on to the heating surfaces, which evaporates the water into the air circulated over the surfaces. The heated, humidified air is then delivered to the room above through a register.

Where long air ducts are necessary, a propeller-type fan is available as an extra item. Other extras include a humidistat and humidity control. It is claimed that the unit can be installed for as low as $125.

Marsh Duraval Air Valve

Jas. P. Marsh Corp., 2073 Southport Ave., Chicago, has placed on the market the Duraval syphon automatic air valve, designed primarily for modernization and replacement application. The particular feature of the valve is its finish, baked on cream enamel, said to harmonize with the average radiator finish better than the nickel-plated finish.

The valve is constructed with a one-piece interior mechanism consisting of a combination float and thermostatic member. This thermostatic action is positive and is a result of the expansion and contraction of a volatile fluid. The valve pin, which is mounted on the float and which operates against a seat in the adjusting screw, is constructed of nickel silver. The valve closes positively against the escape of steam or water and vents all air freely. The construction includes a syphon through the inlet opening which contributes to removing all water or condensation from the valve and this, in turn, helps to eliminate spitting or loss of water through the vent opening. The shell and cap of the valve are made of drawn brass and the bottom or base is a brass casting.

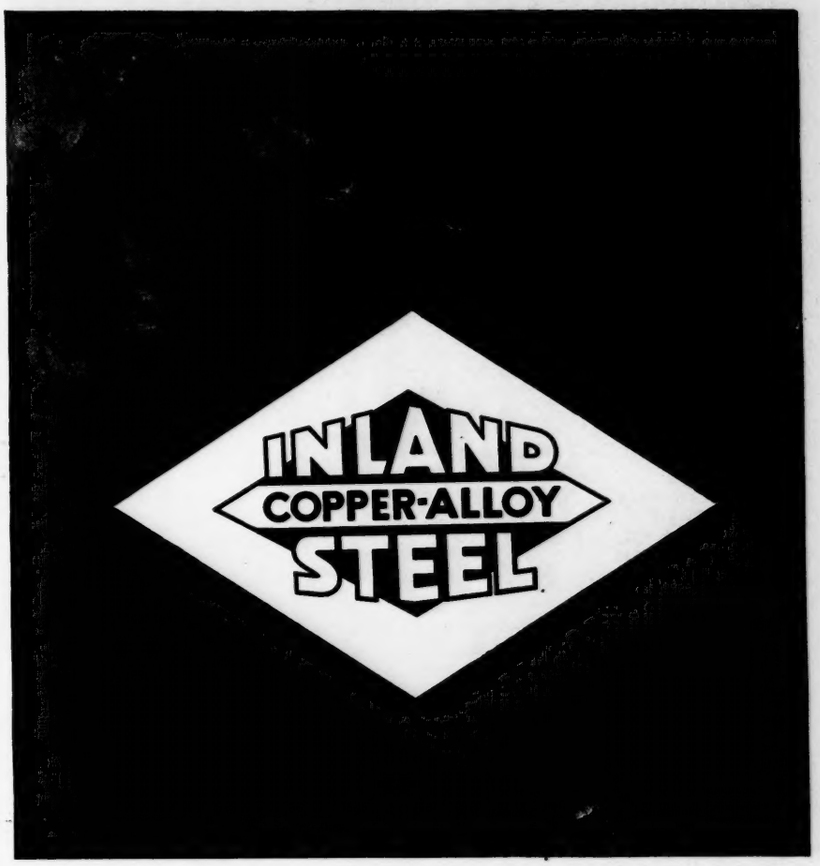
For display purposes, the valves are wrapped in a cellophane envelope which is printed in two colors and the cellophane envelopes are placed in a blue display package with a hinged cover. The inside of the cover is fitted with a consumer appeal display label.

A MODERN FIGHTING METAL

Fights CORROSION

Fights COSTS

Fights FOR SALES



LITTLE by little, quietly, and too often unnoticed the losses from corrosion add up to a staggering total. Fight it with Inland Copper-Alloy Steel.

It fights corrosion—endures longer than any other ordinary iron or steel wherever there is moist air.

It fights costs—reduces the cost per year of service tremendously at only a slight additional first cost compared with ordinary grades of iron or steel. And it costs less than any other corrosion-resisting material—far less than most.

It fights for sales—gives your products the strongest sales appeal of all, most value per dollar, at very little additional manufacturing cost.

Specify Inland Copper-Alloy Steel for roofs, smokestacks, siding, and the like. Use it in your products wherever corrosion can be a factor.

Available in sheets, bars, plates, structurals, any Inland rolled steel product. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Illinois.

NRA CODE

Most Enduring

Iron and steel sheets have been ranked according to rust and corrosion resistance under atmospheric conditions by the American Society for Testing Materials ranking based on tests at Fort Sheridan, Annapolis and Pittsburgh. Copper-bearing steel sheets lead the list.

INLAND STEEL

ABLE SERVANT OF THE CENTRAL WEST

Sheets Strip Tin Plate
Plates Structurals Piling
Rails Track Accessories
Bars Rivets Billets

Degree-Days and Unit Fuel Consumption—October, 1934

Continuing HEATING AND VENTILATING's seventh year of publishing degree-day data for various large cities in the United States

	Atlanta	Baltimore	Birmingham	Boston	Buffalo	Chicago	Cincinnati	Cleveland
Degree-days for October, 1934	68	256	48	476	455	287	236	349
Degree-days, Sept. 1, 1934 to Oct. 31, '34	68	258	48	529	532	377	264	406
Degree days, Sept. 1, 1933 to Oct. 31, '33	82	238	56	439	542	425	326	399
Degree-days Sept. 1 to Oct. 31, Normal	96	223	—	411	494	356	248	393
Lb. coal per sq. ft. rad., October, 1934..	0.544	2.048	0.384	3.808	3.640	2.296	1.888	2.792
Gal. oil per sq. ft. rad., October, 1934..	0.047	0.176	0.033	0.326	0.312	0.197	0.162	0.239
Cu. ft. gas per sq. ft. rad., October, 1934	6.53	24.58	4.61	45.70	43.68	27.55	22.66	33.50

	Davenport	Denver	Des Moines	Detroit	Duluth	El Paso	Fort Wayne	Grand Rapids
Degree-days for October, 1934	232	226	227	—	550	17	337	389
Degree-days, Sept. 1, 1934 to Oct. 31, '34	346	411	395	—	917	17	420	485
Degree-days, Sept. 1, 1933 to Oct. 31, '33	432	285	485	461	921	3	485	532
Degree-days Sept. 1 to Oct. 31, Normal	363	500	357	442	881	40	347	476
Lb. coal per sq. ft. rad., October, 1934..	1.856	1.808	1.816	—	4.400	0.136	2.696	3.112
Gal. oil per sq. ft. rad., October, 1934..	0.159	0.155	0.156	—	0.377	0.012	0.231	0.267
Cu. ft. gas per sq. ft. rad., October, 1934	22.27	21.70	21.79	—	52.80	1.63	32.35	37.34

	Harrisburg	Hartford	Indianapolis	Kansas City	La Crosse	Los Angeles	Louisville	Memphis
Degree-days for October, 1934	350	460	229	127	343	38	169	50
Degree-days, Sept. 1, 1934 to Oct. 31, '34	379	498	297	225	542	42	190	61
Degree-days, Sept. 1, 1933 to Oct. 31, '33	395	459	356	247	614	90	243	111
Degree-days Sept. 1 to Oct. 31, Normal	329	392	298	214	558	—	186	62
Lb. coal per sq. ft. rad., October, 1934..	2.800	3.680	1.832	1.016	2.744	0.304	1.352	0.400
Gal. oil per sq. ft. rad., October, 1934..	0.240	0.315	0.157	0.087	0.235	0.026	0.116	0.034
Cu. ft. gas per sq. ft. rad., October, 1934	33.60	44.16	21.98	12.19	32.93	3.65	16.22	4.80

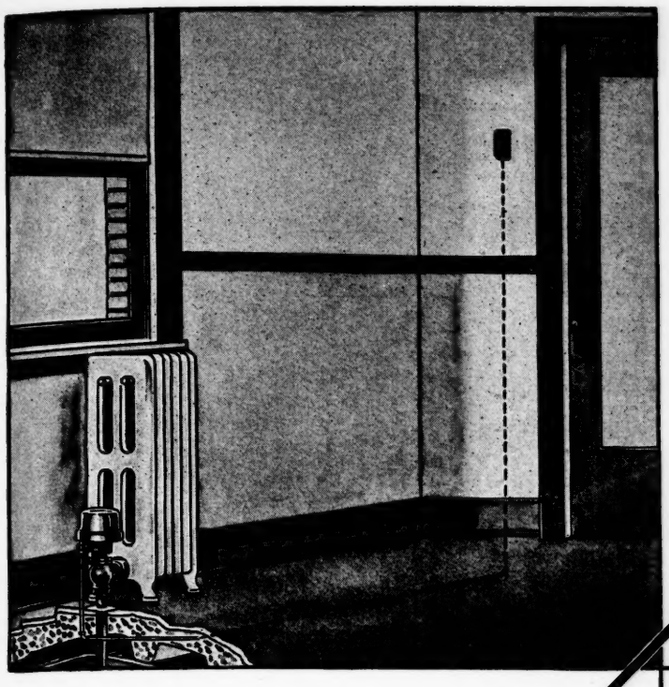
	Milwaukee	Minneapolis	New Haven	New Orleans	New York	Omaha	Peoria	Philadelphia
Degree-days for October, 1934	349	353	417	—	350	174	244	280
Degree-days, Sept. 1, 1934 to Oct. 31, '34	492	600	451	—	366	326	352	288
Degree-days, Sept. 1, 1933 to Oct. 31, '33	499	608	406	5	319	394	433	246
Degree-days Sept. 1 to Oct. 31, Normal	534	574	399	—	276	329	384	242
Lb. coal per sq. ft. rad., October, 1934..	2.792	2.824	3.336	—	2.800	1.392	1.952	2.240
Gal. oil per sq. ft. rad., October, 1934..	0.239	0.242	0.286	—	0.240	0.119	0.167	0.192
Cu. ft. gas per sq. ft. rad., October, 1934	33.50	33.89	40.03	—	33.60	16.70	23.42	26.88

	Pittsburgh	Portland, Ore.	Providence	Reading	Rochester	St. Louis	Salt Lake City	San Francisco
Degree-days for October, 1934	324	243	456	347	462	114	277	113
Degree-days, Sept. 1, 1934 to Oct. 31, '34	366	358	488	383	527	174	422	203
Degree-days, Sept. 1, 1933 to Oct. 31, '33	367	415	449	358	558	253	243	259
Degree-days Sept. 1 to Oct. 31, Normal	313	437	410	344	503	205	406	260
Lb. coal per sq. ft. rad., October, 1934..	2.592	1.944	3.648	2.776	3.696	0.912	2.216	0.904
Gal. oil per sq. ft. rad., October, 1934..	0.222	0.167	0.313	0.238	0.317	0.078	0.190	0.077
Cu. ft. gas per sq. ft. rad., October, 1934	31.10	23.33	43.78	33.31	44.35	10.94	26.59	10.85

	Scranton	Seattle	Spokane	Syracuse	Toledo	Trenton	Washington, D. C.	Wichita
Degree-days for October, 1934	477	304	425	483	360	365	277	94
Degree-days, Sept. 1, 1934 to Oct. 31, '34	534	484	687	536	432	392	283	179
Degree-days, Sept. 1, 1933 to Oct. 31, '33	535	568	662	562	472	370	285	180
Degree-days Sept. 1 to Oct. 31, Normal	457	595	707	521	378	242	251	192
Lb. coal per sq. ft. rad., October, 1934..	3.816	2.432	3.400	3.864	2.880	2.920	2.216	0.752
Gal. oil per sq. ft. rad., October, 1934..	0.327	0.208	0.291	0.331	0.247	0.250	0.190	0.064
Cu. ft. gas per sq. ft. rad., October, 1934	45.79	29.18	40.80	46.37	34.56	35.04	26.59	9.02

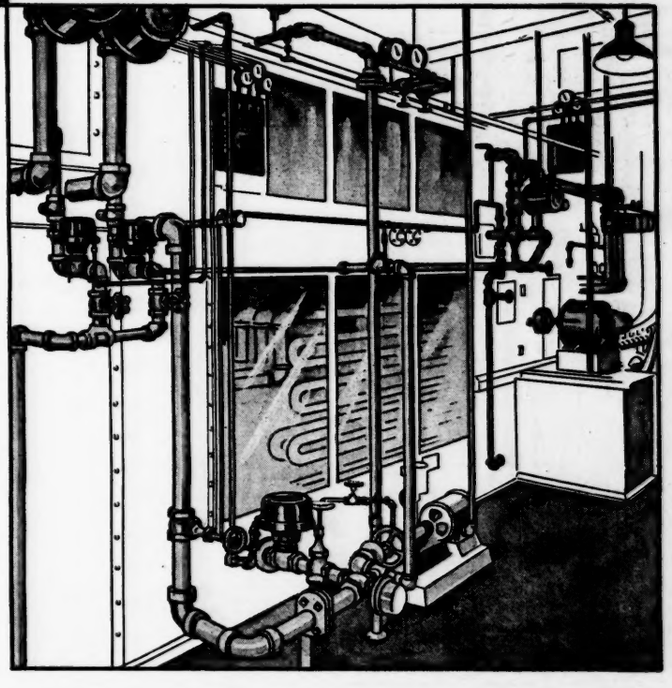
Fuel consumption figures given above are based on certain conditions, and for other conditions corrections must be made. The figures assume the use of steam radiators emitting 240 B.t.u. per sq. ft. per hr., a system operating at 100% efficiency, and radiators calculated for maintaining 70° in zero weather. Heating values assumed for the fuels are 12,000 B.t.u. per lb. for coal, 1000 B.t.u. per cu. ft. for gas, and 140,000 B.t.u. per gal. for oil. To correct for other heating values, efficiencies, and design conditions, follow the method explained in the "Heating and Ventilating Degree-Day Handbook."

TEMPERATURE CONTROL PROBLEMS



From
the SIMPLE *application,*
a dependable Room
Thermostat Controlling
a Radiator Valve ~

To
the More Complex
installation, suiting the
exacting and varied
requirements of the
Air Conditioning Industry-



Solved by

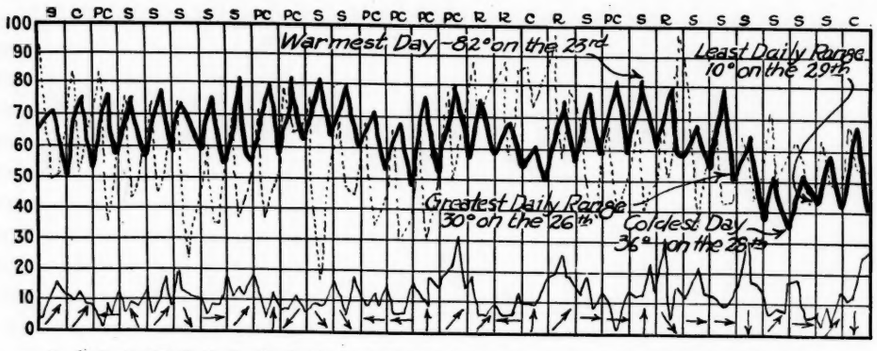
JOHNSON. **A single, nation-wide organization devoted to one line of endeavor — the DESIGN, MANUFACTURE, AND INSTALLATION of automatic temperature regulation apparatus. JOHNSON SERVICE COMPANY: Milwaukee, Wis., and Principal Cities**

JOHNSON AUTOMATIC HEAT & HUMIDITY CONTROL

for *Individual Rooms* · · · · for *Air Conditioning* · · · · for *Heating Zones*

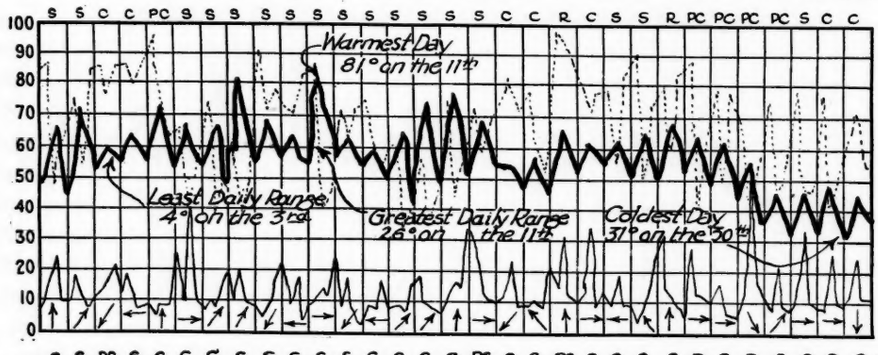
THE WEATHER FOR OCTOBER, 1934

Plotted from records especially compiled for HEATING AND VENTILATING by the U. S. Weather Bureau. Heavy curves (T), temperatures in deg. F.; dotted lines (H), per cent relative humidity, from readings at 8 a.m., noon, and 8 p.m., except for New York, which shows hourly readings. Light lines (W), wind velocity in m.p.h. Arrows indicate prevailing wind directions. S—clear; PC—partly cloudy; C—cloudy; R—rain; Sn—snow.



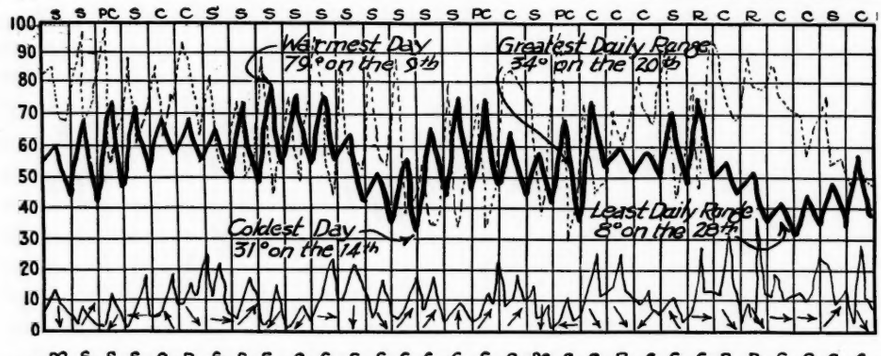
St. Louis

Mean temp. for month, 63.2°; aver. wind velocity, 10.9 m.p.h.; prevailing direction of wind, S.



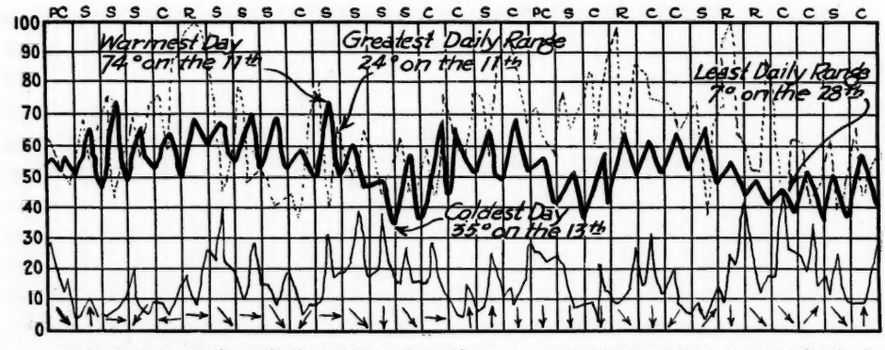
Chicago

Mean temp. for month, 56.0°; aver. wind velocity, 10.6 m.p.h.; prevailing direction of wind, W.



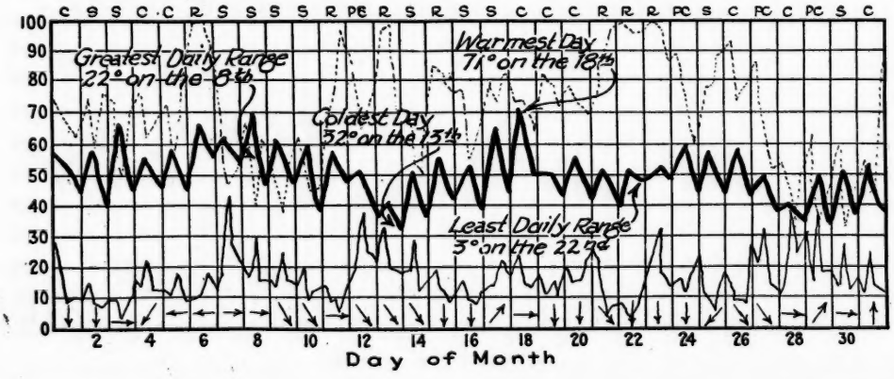
Pittsburgh

Mean temp. for month, 54.6°; aver. wind velocity, 9.3 m.p.h.; prevailing direction of wind, W.



New York

Mean temp. for month, 53.8°; aver. wind velocity, 14.7 m.p.h.; prevailing direction of wind, N.


Greatest Daily Range 22° on the 8th
Warmest Day 71° on the 18th
Coldest Day 32° on the 13th
Least Daily Range 3° on the 22nd
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Day of Month

Boston

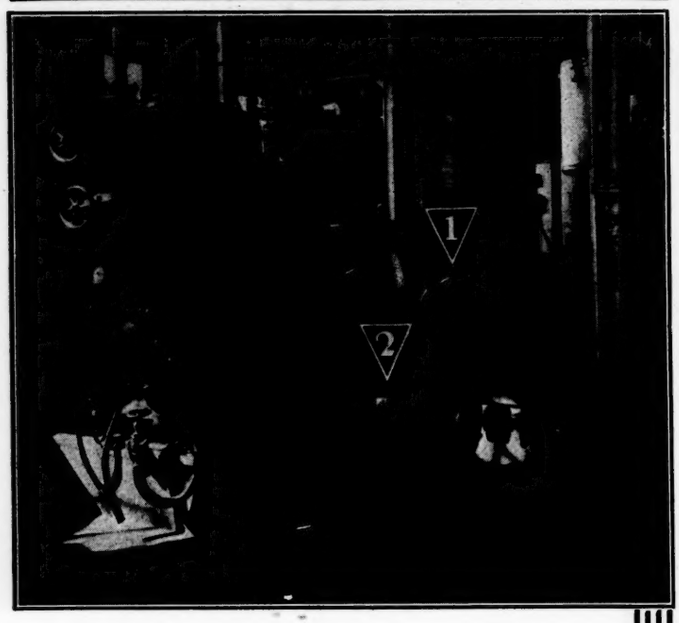
Mean temp. for month, 49.6°; aver. wind velocity, 15.0 m.p.h.; prevailing direction of wind, W.

A 230 MILLION DOLLAR MARKET

A market that ranges from the minor equipment of the modern home to the vast systems required for the towering office building. A market that covers the enormous field of air conditioning for industrial plants —for stores, theatres, public buildings, schools, institutions—for transportation units—ships, railway trains, airplanes . . . A market created and supported by the modern trend— the modern *demand.* It is *your* market—and as an exponent of the various phases of air conditioning—the range, mechanics, problems, governing factors—HEATING AND VENTILATING is the Leading Paper in the Field.

Your advertising in HEATING AND VENTILATING gives your product the added selling push which can well be the making of a sale, and backs your selling force to the fullest extent.

AIR CONDITIONING
★ **HEATING** ★
VENTILATING



1 *Century 60 HP, Type SCH Squirrel Cage Induction Motor, V-Belt Connected to Compressor*

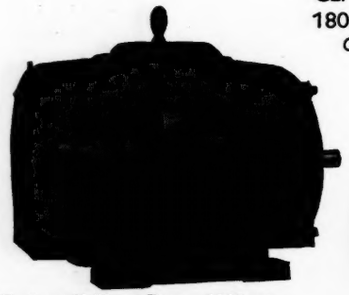
2 *Century 5 HP, Type SC Squirrel Cage Induction Motor Direct Connected to Pump*

A Leading Part in Air Conditioning

Refrigerators...Compressors...Pumps...Fans...Blowers...Ventilators — in driving this and similar air-conditioning equipment Century Motors play a leading part. Many of them have been steadily on the job for more than 30 years — all of them set a conspicuous record in meeting the service requirements so essential in air-conditioning and refrigeration installations . . . Consult Century Engineers.

Single Phase...Polyphase...Direct Current...Single Speed, Multi-Speed—1/250 to 600 Horse Power.

CENTURY ELECTRIC CO.
1806 Pine St., St. Louis, Mo.
Offices and Stock Points in Principal Cities



Century 60 Horse Power, 1200 r.p.m. 60 Cycle, 220/440 Volt, Squirrel Cage Induction Splash Proof Motor. Two-way Ventilation.

Century 3 Horse Power, 60 Cycle, Ball Bearing, Flange Mounting Splash Proof Motor.

Century MOTORS

Air Conditioning Extends Area of Chocolate Factory

(Concluded from page 29)

compressors at high suction pressure, while simultaneously, those not operating under high suction pressure can be operated under low pressure—an ideal arrangement which meets the conditions imposed by the old plant as well as the new plant.

Engineers for air conditioning were Josiah H. Smith and Wm. G. R. Braemer. Contractors were: for vertical condenser, Harry Cooling & Equipment Company; for air conditioning equipment, Wm. J. Strandwitz & Company; for refrigeration piping and equipment, De La Vergne Engine Company; for fans, pumps, heaters, traps, piping, William H. Walters & Sons; for cork and cold insulation, John R. Livezey; electrical, Silcox & Sons; dehumidifier coils, accumulator, etc., Mack Machine Company; sheet metal, Quinn Brothers.

Equipment List: refrigerating equipment, including condenser, compressor, receivers, oil traps, etc., De La Vergne; synchronous motor, Burke; condenser and dehumidifier pumps and fans, Buffalo; pump and fan motors, Lincoln; dehumidifier coils, Frick; temperature and humidity controls, Powers; thermostatic traps, Webster; sheet metal, American; air heaters, Aerofin.

Subsistence Homesteads: A Government Activity

(Concluded from page 44)

tial equity in his home and to reduce materially the financial burden upon his limited resources.

In connection with design, the Division has published a number of bulletins, designed to assist architects and engineers working on these projects. The Division requires, and has very specific rules regarding plans and estimates both in the preliminary and final stage. In addition, various types of daily reports are used to keep up to date a building progress chart. The estimate sheets and cost data supplied are as complete as possible.[4]

Heating

So far only one project is under way where heat other than stove heat is specified. This is the Decatur, Ind., group where warm-air furnace systems are being installed. The contract on this job has been let to a general contractor.[5] Heating costs per homestead are, roughly, $90 for the furnace and other materials, $30 for labor.

In general, the heating depends on two factors—

[4]The Division has published three booklets of interest to contractors, engineers and manufacturers: a collection of house plans, entitled "Homestead Houses"; Bulletin 5, "Information Concerning Architectural Planning and Estimating for Project Buildings," and Bulletin 6, "Information Concerning Constructing and Inspecting the Construction of the Project."

[5]Excerpts from the heating specifications for the project at Decatur follow:

Furnace—Each furnace shall be all cast iron of sufficient capacity to heat the residence . . . to the temperatures guaranteed . . . without forcing. All castings shall be heavy with joints made gas and smokeproof by double sealing with approved asbestos cement. All grates shall be of the heavy duplex bar type. Each firebox shall be of heavy construction built in two sections. Each combustion chamber shall be a one-piece extra heavy casting. Each radiator shall be cast in one section without joints and shall be gas and smokeproof. Each shall have an internal damper. All heaters shall be enclosed

geographical location and the groups for which the projects are designed. In the colder climates more extensive heating equipment is required than is the case in southern climates. Also, if the group for which the project is erected is a very poor one, the heating costs must be adapted to the resources of the group.

The following table, covering a heating cost analysis, indicates the cost as well as the type of system the Division has in mind for buildings where central heating will be used.

HEATING COST ANALYSIS

	Steam[1]	Hot Water[2]	Warm Air[3]
Roughing-In Cost			
Mechanic	$ 26.40	$ 35.20	$ 26.40
Helper	18.00	24.00	18.00
Materials	65.89	66.70	42.00
Boiler and Radiator Cost			
Mechanic	13.20	8.80	17.60
Helper	9.00	6.00	12.00
Heater and Radiators	132.16	137.46	94.50
Total Cost			
Labor	66.60	74.00	74.00
Materials	198.05	204.16	136.50
Grand Total	$264.65	$278.16	$200.50

[1]A one-pipe system with unjacketed round boiler in basement. House is typical one-story, with three bedrooms, living room and bath, and totals 13,000 cu. ft. of contents, 222 sq. ft. radiator. Steamfitter's rate at $1.10, helper at $0.75 per hr. With fitter at $1, total cost would be $261.05; at $1.20, $268.25. Add $11 to above totals if jacketed boiler is used.

[2]Two-pipe overhead water system, with No. 7-H unjacketed Arcola in living room. House with 13,000 cu. ft. contents, 283 sq. ft. radiator and an additional 65 sq. ft. from the heater. No radiator figured for kitchen. Steamfitter's rate at $1.10, helper at $0.75 per hr. With fitter at $1, total cost would be $274.16; at $1.20, $282.16. Add $17.75 if jacketed Arcola is used.

[3]Gravity warm-air system, with furnace in at least a 7-ft. basement, using floor registers. House has five rooms and bath, with 13,000 cu. ft. contents, and heat loss of 66,500 B.t.u. per hr. at 0°, with furnace delivery of 67,900 B.t.u. Mechanic's rate at $1.10, helper at $0.75 per hr. With mechanic at $1, total cost would be $206.50; at $1.20, $214.50. Add $23 if piping is to be insulated with ½-in. air cell covering.

As shown in another table accompanying this article, not all of the projects are even under way as yet.[6] However, at the present time it seems that so far as heating is concerned the houses will fall into probably four general groups. The first will be those far south, where no heat is necessary. The second will be in fairly warm climates where either stove or fireplace heat will be sufficient. The third group will be those far enough north so that stove heat might take care of the minimum requirements, but if not, warm air can be used, and the fourth group will be those where the resources of the homesteaders and the climate are such that a one-pipe heating system, Arcola hot water system, or a warm-air system would be desirable.

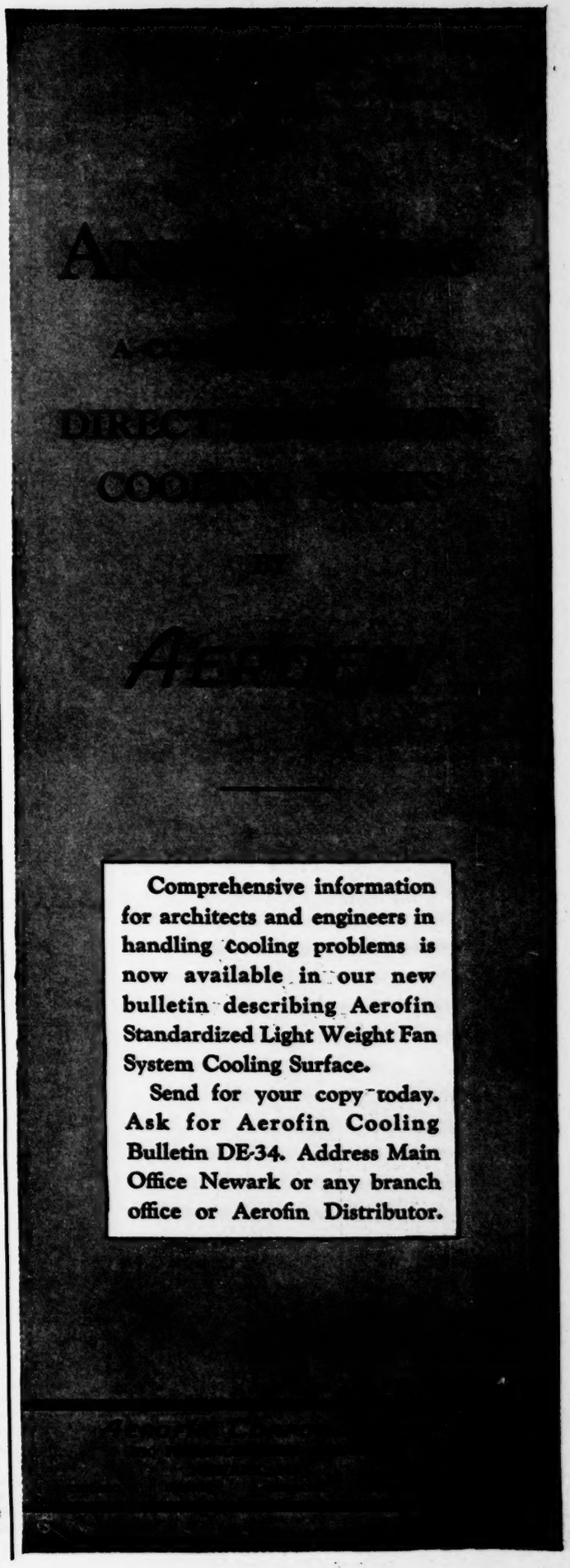
in a metal jacket and hood or bonnet of No. 28 U.S.S. gauge galvanized iron . . .

Piping—All leader ducts, wall riser ducts, and cold-air pipes shall be galvanized iron not less than No. 28 U. S. standard gauge and with locked side seams, with all joints double seamed or lapped 1¼ in. . . .

Cover all warm-air leaders, boxes, and boots with one thickness of asbestos felt weighing at least 10 lb. per 100 sq. ft. . . .

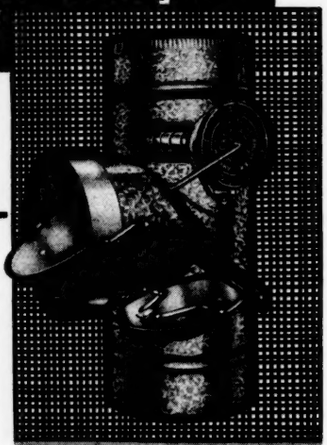
Heating Grilles—Furnish and install all heat grilles in floors and walls. They shall be steel body and face of approved stock design with removable louvers and shall be delivered with black japanned finish. Wall grilles shall be permanently attached to wall to prevent air leakage between riser and head of grille . . .

[6]Applications for loans aggregate more than $4.5 billion. The Division has therefore been forced to confine its activity to the establishment of selected demonstration projects throughout the country. The allocation of funds for projects to be included in this program is now practically completed.


Comprehensive information for architects and engineers in handling cooling problems is now available in our new bulletin describing Aerofin Standardized Light Weight Fan System Cooling Surface.
Send for your copy today. Ask for Aerofin Cooling Bulletin DE-34. Address Main Office Newark or any branch office or Aerofin Distributor.

"CHACE supplies the ACTIVE ELEMENT in our AUTO-CHECK Draught CONTROL!"

AUTO-CHECK is made for home heating control purposes by:
DELAMERE & WILLIAMS Limited
Toronto Canada

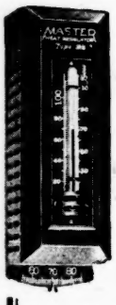


If your problem is a matter of automatically controlling temperature or one where it is desired that the slightest change in temperature shall automatically work a switch, signal or control, then Chace Thermostatic Bimetal used as the active element will assure you reliable and economical service.

Sold in Sheets, Strips and in Shapes formed to own specifications.

CHACE THERMOSTATIC BIMETAL
"It Bends with the Heat"

W. M. CHACE VALVE CO.
1606 Beard Avenue . . . Detroit, Mich.



NEW
DAMPER REGULATOR
$13.50 to Dealer

Type B-22
Two Position

is sturdy, quiet and priced right. Has small, four-pole induction motor operated at 16 volts. Small transformer mounted outside housing, with approved cord and plug. Basement switch. Listed as standard by Underwriters' Laboratories. *Write for full details.*

WHITE MANUFACTURING CO.
2362 University Ave.
ST. PAUL, MINN.

MASTER HEAT REGULATOR

Title II of Housing Act Launched

(Concluded from page 36)

to farmers who own or may own stock acquired in connection with a general agricultural purpose loan from these associations. Loans for farm dwellings, it is stated, will be eligible for guaranty by FHA up to 20% of their principal.

Home-improvement loans on a single dwelling, these rules provide, may be made in amounts from $100 to $2000, and will ordinarily run for a year, although extensions up to 18 months may be permitted.

Interest on these loans will be at the rate of 6%, and funds will be disbursed in accordance with an approved budget as they are needed to pay for the alterations, repairs or improvements.

How About the Heating Industry?

All of these increases would mean little to heating men if their own business were not showing gains. It has already been pointed out that 11.34% of the FHA loans made so far are for heating. But other statistics as well are just as encouraging. Although sales figures for October are not available as we go to press, September reports show that even in that early month of the FHA drive heating business was picking up.[6] The increases from September, 1933, to September, 1934, in some equipment sales are shown below:

	% Increase
Radiators	21.0
Stokers	35.0
Round boilers	2.0
Square boilers	22.9
Steel heating boilers	128.6

[6]This is also shown by Heating and Ventilating's Index of Heating Business Activity which appears elsewhere in this issue in graphical form, and which, after adjustment was made for the usual seasonal gains, rose from 45.5 in August to 50.4 in September.

NEW CATALOGS

Air Controls Inc., 1960 West 114th St, Cleveland. Four-page, standard-size illustrated folder entitled "Air-ings," featuring the advantages of forced-air circulation.

Burnham Boiler Corporation, Irvington, N. Y., has issued a standard-size, 16-page illustrated and colored catalog on its oil-burning boiler. A second recent publication is a four-page standard size folder describing the Burnham "slenderized" radiator.

Continental Electric Co., St. Charles, Ill., manufacturer of Cetron photo electric cells and other vacuum devices, has issued an interesting bulletin concerning photo electric cells and their various applications. Standard size, 6 pages.

Gorton Heating Corp., Cranford, N. J. Bulletin 99, a four-page, standard-size folder describing the Gorton Surevent equalizing system designed to equalize steam and vapor heating systems so that all radiators will heat up evenly and quickly.

Ilg Electric Ventilating Co., 2850 North Crawford Ave., Chicago. Booklet C50. A condensed catalog of the company's heating, cooling, and air conditioning equipment in vestpocket size. Numerous illustrations, tables and capacities and dimensions and descriptions of fans, blowers,

unit heaters, and cooling equipment. 32 pages, paper-bound, 3¼ in. x 5¾ in.

Joliet Heating Corp., Joliet, Ill. A four-page, standard-size folder describing the "Comfortmaker," a jacketed steel warm-air furnace type conditioner. This includes blowers, filters, and a space for inserting ice or heat transfer surface through which well water can be circulated for cooling.

The Linde Air Products Co., New York. A new and revised edition of "Precautions and Safe Practices." Since the original publication of this booklet several years ago, it has gained wide popularity as a reference work on this important phase of safety in industry. While the subject of safety is well standardized, and therefore subject to but little change, the advances in the oxy-acetylene process itself, and its widening use during recent years, have shown where additional emphasis in safety precautions is needed, and have necessitated some new suggestions. All of this has been incorporated in the new edition of this booklet, to fill the demand for a more up-to-date handbook on this subject.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., has published a standard-size, 20-page bulletin entitled "Heat Acceleration, What It Is and How it Differs from Heat Anticipation." A heat-accelerated thermostat is described as one in which the burner is started at a predetermined degree and is held in operation until the room temperature actually rises due to the influence of the heating system. Then the thermostat brings into action the artificial heat means which times the further length of burner operation so as to insure heat reaching all parts of the system. Blue illustrations include charts and diagrams.

National Radiator Corp., Johnstown, Pa., has published a four-color wall chart which shows heat transmission coefficients for various types of construction of walls, roofs, windows, etc. Colored drawings illustrate each general type of construction. This company has also recently revised its Fitters Guide, an eight-page folder containing an easy method of figuring radiation for steam, vapor, and hot water heating systems.

Owens-Illinois Glass Co., Toledo, Ohio. A special 16-page booklet for use by the warm-air heating industry pointing out to consumers the benefits to be secured through the National Housing Act. The booklet is entitled "An Important Benefit You Can Secure Through The National Housing Act." It explains in simple language by the question and answer method how the homeowner can secure such financial aid as may be required for immediate repair and remodeling of his property.

The booklet also discusses the important subject of house insulation and explains the effectiveness of Red Top insulating wool, a new glass product developed by the industrial materials division of Owens-Illinois and sold by the United States Gypsum Co., Chicago.

Propellair, Inc., Springfield, Ohio. A broadside which folds to standard size, featuring the company's line of large propeller fans for industrial uses. The folder illustrates numerous applications of these fans in a wide range of industrial plants.

Republic Steel Corp., Central Alloy District, Massillon, Ohio. Bulletin No. 127, Sheet Iron Primer, a 64-page, profusely-illustrated handbook telling a step-by-step story of how sheet metal is manufactured. The product is traced from the ore to the final inspection of the completed sheet. It contains gauge tables and an interesting glossary of metallurgical terms.

Shell Petroleum Corp., Shell Building, St. Louis. "Fundamentals of Oil Burner Operation," a 12-page booklet by Dr. R. T. Goodwin, fuel oil technologist. Written for the homeowner and telling him what he should know about the fuel oil he buys, his oil burner, and its operation.

check these Points ✓

—then you will say

DAVIS PRESSURE REGULATORS!

1. *No Springs.* Pressure is balanced by weight, Always constant, never grows weak.
2. *No Diaphragm.* No delicate parts to require bothersome adjustment and maintenance.
3. *No Gaskets, No Packing.* The Davis construction eliminates the common causes for leaks and friction.
4. *Visible Action.* You see the valve act automatically; you can test it yourself instantly.
5. *Constant Range.* The Davis patented inner valve gives accurate regulation regardless of flow. Oil cushioning smooths out pressure fluctuations and prevents chattering.

Get Davis' Recommendations for all of your valve requirements.

DAVIS REGULATOR COMPANY
2553 S. Washtenaw Avenue, Chicago, Illinois

YOUR COPY IS READY!

LATEST INFORMATION ON FORCED CIRCULATION HOT WATER HEATING SYSTEMS

Bell and Gossett's new loose-leaf catalog brings you latest engineering achievements in low-cost domestic water heating and automatic hot water circulation controls.

The most complete source of information of its kind ever published! 80 pages of installation diagrams, water heater capacity charts, piping layouts and fully detailed information on the new Bell & Gossett line of Indirect Water Heating Systems, Booster Pumps, Flow Controls and allied Heating Specialties. Every Heating Contractor on the alert for equipment which can be easily sold on a money-saving basis should have a copy of the new B & G Catalog.

SEND THIS COUPON TODAY

BELL & GOSSETT CO., Dept. A 3000 Wallace St., Chicago
Send at once your new 80-page Catalog.

Name.....

Address.....

CLASSIFIED ADVERTISING

Advertisements under this heading payable in advance, $2 for first seven lines, figuring about 6 ordinary words to a line. Each additional line 35c extra. To insure insertion, copy must be received not later than the 20th of the month preceding date of issue.
HEATING AND VENTILATING—148 Lafayette Street, New York, N. Y.

FOR SALE

1—156 H.P. low pressure oil burner Kewanee boiler.
1—B10 Jennings water heater with vacuum pump direct connected to 1½ H.P. motor. Manufactured by Nash Engineering Co.
1—Simplex oil burner direct connected to 2 H.P. motor. Manufactured by Bunting Iron Works.

This equipment has been only slightly used. Your inquiries are solicited.
R. S. Cole, York Ice Machinery Corporation, York, Pa.

SALES ENGINEER — with proven sales record and excellent contacts would like connection with reliable manufacturer of heating and ventilating equipment or pumps to represent them in Washington, D. C. Would handle both government and local territory business. Address Box 444, care HEATING AND VENTILATING, 148 Lafayette St., New York.

RADIATOR SALES OPPORTUNITY

Strong established manufacturer. Outstanding new advanced type heating radiator. High grade experienced sales representatives who can operate upon straight commission basis should write for complete particulars. State qualifications fully. Address Post Office Box 1222, Pittsburgh, Pennsylvania.

The New York Blower Company requires successful and experienced fan and unit heater salesmen. For further information address The Sales Manager, 3155 Shields Ave., Chicago, Ill.

AIR CONDITIONING COURSE

The opportunities created by the growth and development of AIR CONDITIONING will be open to trained men. Men interested in a serious study of Air Conditioning, Installation and Maintenance, as well as Complete Air Conditioning Engineering will want to receive our free bulletin descriptive of these new American School courses. Write for your copy today. Box 443, care HEATING AND VENTILATING, 148 Lafayette Street, New York.

Old Established Manufacturer of fans, blowers, unit heaters and heating coils desires additional sales representatives. Agents should have general knowledge of heating and ventilating. Only those desiring permanent connection considered. State qualifications. Address Box 441, care HEATING AND VENTILATING, 228 No. LaSalle St., Chicago, Ill.

CHICAGO MANUFACTURER whose name commands respect wants dependable salesmen now calling on heating, ventilating contractors in Eastern territory to sell a small specialty on commission. Product so interesting it will give you entree to important men. Box 244, Centerport, New York.

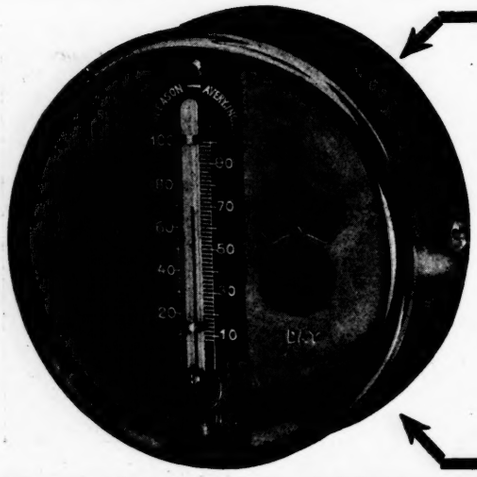
LOOKING FOR EXPERIENCED MEN OR SEEKING A POSITION? Then use these classified advertising columns and reach the engineers and manufacturers of the heating and ventilating field.

WANTED—Established Sales Engineers or Manufacturers' Agents with knowledge of Forced Air Heating or Air Conditioning, who can handle definite territory on commission basis, on a well engineered line of equipment, which is showing a record of outstanding performance, and giving real satisfaction to both customer and dealer. Only high grade men with engineering knowledge need apply. Furnish your engineering record and your complete sales experience and references. Box 435, care HEATING AND VENTILATING, 148 Lafayette St., New York.

HAVE OFFICE FACILITIES and desire to represent reliable manufacturer of Air Conditioning Equipment on commission basis in and adjacent to Chicago. Have had 30 years contracting experience. Address Box 445, care HEATING AND VENTILATING, 148 Lafayette St., New York.

Use this Classified Advertising Page

to secure good men of the heating, ventilating and air conditioning field. Rate, $2 for first seven lines.



LOW COST TEMPERATURE CONTROL

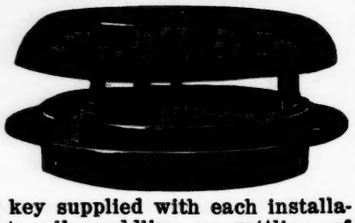
Now reliable temperature control is available at modest cost. Gleason-Avery equipment, of the highest type construction and performance, is so priced that the economies it effects in improved heat control soon returns the original cost. Operating features are many, installation simple. All moving parts are thoroughly lubricated, enclosed in a grease-tight case and never require attention.

GLEASON-AVERY, INC., 27 Clark St., AUBURN, N.Y.

The Gleason-Avery Temperature Regulator lists at $24.75. Dealer prices and further details will be submitted on request.

GLEASON-AVERY
ELECTRIC TEMPERATURE REGULATOR

Adjust Them—Lock Them—Forget Them



KNOWLES NU-NOTCH MUSHROOM VENTILATORS cannot be tampered with—That's important in School Ventilating Systems.

The new, special-locking key supplied with each installation successfully prevents all meddling or rattling of mushroom heads.

10 recessed notches for absolute air control. Use them for up-draft or down-draft ventilation in School auditoriums, theatres or public buildings where the seats are fixed.

KNOWLES MUSHROOM VENTILATOR CO.
41 North Moore Street — NEW YORK, N. Y.

AIR CONDITIONING

A new book by Moyer and Fittz dealing with the fundamentals of air conditioning. Particularly valuable for the engineer whose academic training dates before air conditioning was so generally accepted. 375 pages. Price, $4.00 a copy.

HEATING AND VENTILATING
Book Service
148 Lafayette Street, New York

PACKLESS LEAKLESS • • •

Sylphon Packless Expansion Joints for heating risers are saving space, repairs, trouble and expense in hundreds of modern and modernized buildings everywhere.

Packless—they never need repacking. A seamless Sylphon Bellows seals the joint while permitting necessary movement.

Leakless—they eliminate possibility of damage to plaster and decoration; maintain vacuum essential to heating economy.

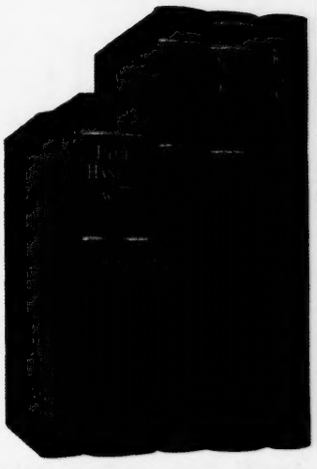
Joint reaches job ready to install. Installation is simple, speedy and permanent.

Full information is yours without obligation. Write for Bulletin XH-300.

FULTON SYLPHON Co.
KNOXVILLE, TENN., U.S.A.

European Representatives, Crosby Valve and Eng. Co., Ltd., 41-2 Foley St., London, W. 1, England; Canadian Representatives, Darling Bros., Ltd., 140 Prince St., Montreal, Quebec, Canada.
Representatives in All Principal Cities in U. S. A.

Which BOOKS *Do* YOU *Need?*



Check your book needs against this representative group of titles from HEATING AND VENTILATING'S Book Service. That book you've always meant to get may be among them.

The contents and price of each are given below. Clip the advertisement, indicate the book or books you want, and mail to us with your check or money order in full. Your order will go out to you postage prepaid.

HANDBOOK FOR HEATING AND VENTILATING ENGRS.
—by J. D. Hoffman. Written for all who design, install or operate heating and ventilating plants. Contains more than 60 pages of invaluable reference tables. 475 pages. Price, $4.50.

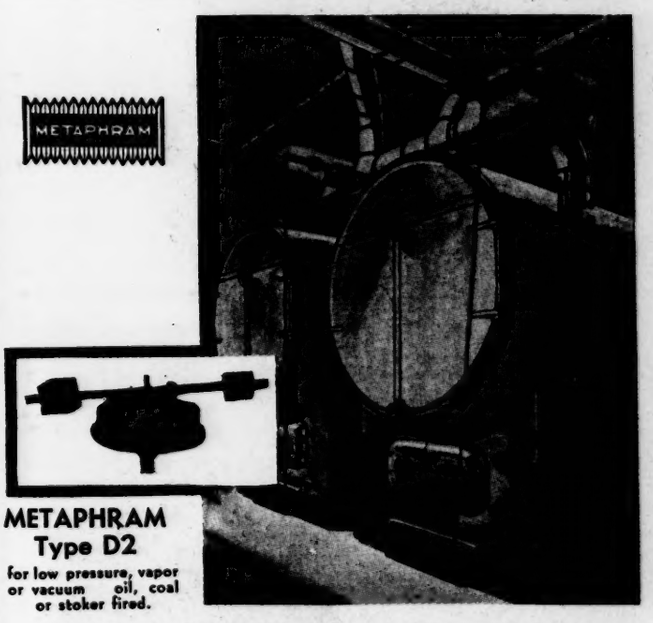
PIPING HANDBOOK
—by Walker and Crocker. An authority in its field. 763 pages. Price, $5.00.

HEATING AND VENTILATION
—by Allen & Walker. Third edition of this popular and comprehensive engineering book. Illustrated, 420 pages. Price, $4.00.

REFRIGERATION
—by Moyer and Fitz. Thorough and authoritative treatment of refrigeration, especially its application in small plants. Contains many valuable tables and charts. 538 pages. Price, $5.00.

HEATING AND VENTILATION
—by Rietschel and Brabbee. A technical book for engineers. 332 pages, with 7 charts. Price, $4.50.

HEATING and VENTILATING
148 Lafayette St. NEW YORK, N. Y.



METAPHRAM
Type D2
for low pressure, vapor or vacuum oil, coal or stoker fired.

METAPHRAM Gradual Control
covers the entire range of domestic hot water and low pressure boilers and tank heaters, either gas, oil or coal fired.

Descriptive Bulletins on Request

NATIONAL REGULATOR CO.
2309 KNOX AVENUE CHICAGO

ALPHABETICAL INDEX OF ADVERTISEMENTS

A

Aerofin Corporation 69
American Air Filter Co., Inc. .... *
American District Steam Co. 8
American Sheet & Tin Plate Co... 12
Ames Pump Co., Inc. 74
Armstrong Machine Works ..... *

B

Badger, E. B., & Sons, Co. 10
Baldor Electric Co. ..... *
Barber-Colman Co. ..... *
Bell & Gossett Co. 71
Byers, A. M., Co. 14

C

Century Electric Co. 68
Chace, W. M., Valve Co. 70
Classified Advertisements 72
Coppus Engineering Corp. ..... *
Crane Co. 7

D

Davis Regulator Co. 71

E

Emerson Electric Mfg. Co. 9

F

Fulton Sylphon Co. 73

G

Gleason-Avery, Inc. 72

I

Inland Steel Co. 63
Iron Fireman Mfg. Co. ..... *

J

Johnson Service Co. 65
Jones & Laughlin Steel Corp. ... *

K

Knowles Mushroom Ventilator Co. 72

M

Mercoid Corporation 10
Minneapolis-Honeywell Regulator Co. 5
Modine Mfg. Co. ..... Front Cover

N

Nash Engineering Co. 16
National Regulator Co. 73
National Tube Co. ..... *

O

Owens-Illinois Glass Co. 13

P

Petroleum Heat & Power Co. 11
Porter, H. W., & Co., Inc. 6
Power and Mechanical Engineering Exposition Section 3-10
Powers Regulator Co. ... Back Cover

R

Railway Express Agency, Inc. ... *
Republic Steel Corp. Inside Back Cover

S

Sarco Co., Inc. 8
Streamline Pipe & Fittings Co.... *
Sturtevant, B. F., Co. ..... *

T

Taylor Forge & Pipe Works .... *

U

U. S. Steel Corporation Subsidiaries 12

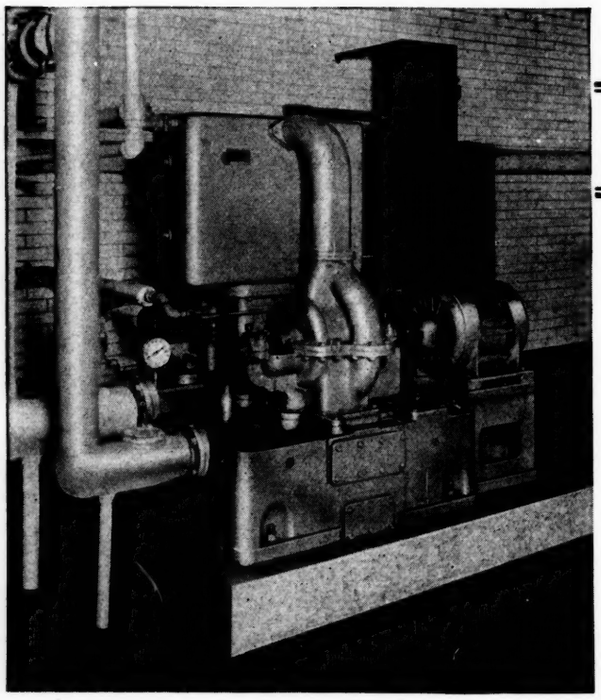
W

Want Advertisements 72
White Manufacturing Co. 70
Whitlock Coil Pipe Co. ..... *
Wing, L. J., Mfg. Co. ..... *

Y

Yarnall Waring Co. 4
Youngstown Sheet & Tube Co. Inside Front Cover

*Advertisement appeared in preceding issue.



AGAIN IT IS TRUE—

In modern buildings where the vacuum return line steam heating system is used, the chances are that the heart of the system is an AMES VACUUM HEATING PUMP.

The illustration shows an Ames Type F Duplex Unit installed in the beautiful new Bronx County Court House, New York City. A judicial choice, we believe, for the new home of the county judiciary.

AMES PUMP COMPANY, INC.

30 CHURCH STREET • NEW YORK, N. Y.

Manufacturers of vacuum heating, condensate, centrifugal pumps, and fuel oil pumping-heating units

Division of American Locomotive Company

Representatives in all principal cities. Products manufactured and sold in Canada by Montreal Locomotive Works, Ltd.

NRA MEMBER U.S. WE DO OUR PART

Write for Bulletin 701

THE FI[illegible]PIPE

TONCAN IRON PIPE cheerfully meets all comers. On sheer merit it has fought its way into places where, until its introduction, the rapid failure of ordinary ferrous pipe was taken as a matter of course.

Conditions today are quite different. Users judge pipe on its proved merits. And because Toncan Iron fights rust—lasts longer—costs less per year of service—it is being written into specifications and ordered by name for dozens of applications where service conditions demand a rust-resistant metal.

Toncan Iron stands alone. It is a refined iron, good in itself, but made better by alloying with it copper and molybdenum. Among the ferrous pipe materials it stands first in rust-resistance, after the stainless alloys.

All Toncan Iron Pipe, 2-inch and larger, is electric resistance welded, and combines the advantages of Toncan Iron with the advantages of Republic's electric welding process—100 per cent weld, perfect roundness, uniform diameter and wall thickness, and freedom from scale. Toncan Iron Pipe, black, is painted blue; galvanized finish is marked with two blue stripes. Couplings are stamped RT.

You need only to glance through "Pipe for Permanence" to know that these are facts. Actual comparative service records are the best proof. Write for a copy today.

REG. U.S. PAT. OFF.
TONCAN
COPPER
MOLYB-DENUM
IRON PIPE

The "world's largest store" pioneers with the first large completely air conditioned windowless department store.

Temperature and humidity in this modern building will be accurately regulated by Powers Control which has been serving Sears, Roebuck & Company since 1905 in many of its prominent buildings.

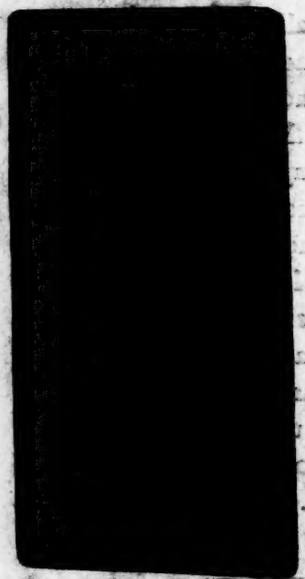
Nine other Sears retail stores, similar to the building shown at the left, are regulated by Powers Control.

The Powers Regulator Co., 2720 Greenview Ave., Chicago; 231 E. 46th St., New York—Offices in 43 Cities in the United States and Canada.

Sears, Roebuck & Company
L. B. DeWitt, Property Manager
C. Roberts, Construction Manager

Architects
Nimmons, Carr & Wright, Chicago
for all Sears, Roebuck & Co. buildings.

Consulting Engineer
Martin C. Schwab, Chicago
for all Sears buildings.



The POWERS Type D
Vapor Disc Thermostat

POWERS